WATTLE RESEARCH INSTITUTE
- 6 OCT 1956
UNIVERSITY OF NATAL, P.M.B.

AGRICULTURAL Chemicals

IN THIS ISSUE:

- Hyacinth Control
- 1956 in Review
- Phosphates in Soils
- Pesticide Hazards
- F-P Mixtures
- Medfly Control
- Ohio Pesticide School

September, 1956

Spring Lake, N. J. **NACA** September 5-7

TWENTY-THIRD ANNUAL MEETING

dawn of a new era of

CONTROL

TERRACLOR*

THE NEW SOIL FUNGICIDE

NOW ACCEPTED FOR:

Cotton	Damping-Off
Cabbage **Cauliflower** **Broccoli** **Brussels Sprouts**	Club & Black Root
Certain Ornamentals	Crown Rot Black Rot Stem Rot Flower Blight
Alfalfa & Clover	Crown Rot
Green Beans	Root & Stem Rot
Potatoes	Scab & Damping-Off
Lettuce	Leaf Drop & Bottom Rot
Wheat	Common Smut

TERRACLOR successfully controls certain soil-borne diseases. The damage caused by these diseases has been realized only recently, much of it having been attributed to other agents. TERRACLOR is the first powdered, non-volatile soil fungicide introduced. TERRACLOR has a long residual action — one application often is effective from planting time to crop maturity.

Available as: 20% Dust, 75% Wettable Powder and 2 Lb. Emulsifiable.

*TERRACLOR is a trademark of Olin Mathieson Chemical Corporation

MATHIESON

OLIN MATHIESON CHEMICAL CORPORATION
INSECTICIDE DIVISION
Baltimore 3, Md. • Little Rock, Ark. • Fresno, Calif. • Phoenix, Ariz.
Williamston, N.C. • East Point, Ga. • New York, N.Y. • Houston, Texas

A *NEW* GIANT SERVANT OF AGRICULTURE

Our NEW STANDARD GRADE MURIATE is winning wide approval and acceptance.

Place your orders for early delivery with P.C.A. Your production and operating people will be glad you did.

P.C.A.
"The SALT of the EARTH"
RED MURIATE

POTASH COMPANY OF AMERICA
CARLSBAD, NEW MEXICO.

General Sales Office . . . 1625 Eye Street, N.W., Washington, D.C.
Midwestern Sales Office . . . First National Bank Bldg., Peoria, Ill.
Southern Sales Office . . . Candler Building, Atlanta, Ga.

"ATTACLAY® gives one-material, across-the-board service?

. . . that does it!"

This spider mite might have surmounted a lesser obstacle. Now it is done. But the future for formulators and users looks all the brighter.

Across-The-Board In Formulations. Processors in ever-growing numbers adopt Attaclay as their *one* carrier and diluent for *all* production. These formulators have product lines that range from six to sixty mixtures, covering dust bases, wettable powders, and finished dusts.

Across-The-Board In Savings. The "one-material plan" means vastly lowered costs through inventory simplification. Scheduling and procurement problems are next to non-existent. Carrier-handling costs are cut to the bone.

Across-The-Board In Easier Processing. Attaclay is trade-preferred because it's super-sorptive. It shortens cycle times and cuts "clean-out" downtime in mills or impregnators. It works well with all of the popular poisons. It gives new meaning to product quality.

Need A Hand in the form of literature, samples, technical help? Use the handy coupon for fast M & C service.

ATTAPULGUS

ATTAPULGUS PRODUCTS *from*

MINERALS & CHEMICALS CORPORATION OF AMERICA
9 ESSEX TURNPIKE, MENLO PARK, NEW JERSEY

ALWAYS A BETTER WAY...

MINERALS & CHEMICALS CORPORATION OF AMERICA
9 Essex Turnpike, Menlo Park, N. J.

Please send me:

☐ Complete, up-to-date technical literature
☐ Free sample of Attaclay

name ______ title ______
company ______
address ______
city ______ zone ______ state ______

AGRICULTURAL *Chemicals*

National
Agricultural
Chemicals
Association
Sept. 5-7

This Month's Cover

Officers of the National Agricultural Chemicals' Association and 1956 program chairman; top: president, W. W. Allen; vice-president, F. Hatch. Bottom: program chairman, Alfred Weed and NAC executive secretary, Lea Hitchner.

Publisher
Wayne E. Dorland
Editor
Eleonore Kanar
Associate Editor
Donald Davis
Advertising Manager
Ralph Dorland
Midwestern Manager
Robert F. Garty

Editorial Advisory Board
Dr. Alvin J. Cox
Lea S. Hitchner
Dr. S. E. A. McCallan
Dr. Charles Palm
Dr. Colin W. Whittaker

MEMBER AUDIT BUREAU OF CIRCULATIONS

Vol. 11, No. 9 **September, 195**

AGRICULTURAL *Chemicals*

ARTICLES

EDITORIAL 33

GUEST EDITORIAL 35
By W. W. Allen

CONGRESS APPROVES CONTROL PROGRAM ON WATER HYACINTHS 36

THE 1956 PESTICIDE SEASON IN REVIEW 39

EQUILIBRIUM OF RETENTION OF PHOSPHATES IN THE SOIL AND MAINTENANCE OF ITS PHOSPHORIC POTENTIAL 43
By G. Barbier and J. Chabannes

THE FERTILIZER-PESTICIDE PRODUCTION PLANT 46

SPRAY PROGRAM AGAINST THE MEDITERRANEAN FRUIT FLY 48

AUTOMATIC CONTROL OF FEED RATES AT NEW WISCONSIN FERTILIZER PLANT 50

OHIO PESTICIDE INSTITUTE CONFERENCE HIGHLIGHTS 52

NAC CONVENES AT SPRING LAKE, SEPT. 5-7 55

HAZARDS IN THE APPLICATION OF PESTICIDES 56

FEATURES

IN THE SPOTLIGHT THIS MONTH 13

FERTILIZER VIEWS AND NEWS 59
By Vincent Sauchelli

TECHNICAL SECTION 61

WASHINGTON REPORT 77
By Donald Lerch

THE LISTENING POST 81
By Kelvin Dorward and Paul Miller

INDUSTRY NEWS 87

INDUSTRY MEETING CALENDAR 118

SUPPLIERS' BULLETINS 123

PROFESSIONAL DIRECTORY 141

CLASSIFIED ADVERTISING 143

ADVERTISERS' INDEX 145

TALE ENDS 146

PUBLISHED monthly on the 1st by Industry Publications, Inc.

ADVERTISING and Editorials office, P. O. Box 31, Caldwell, New Jersey.

PUBLICATION Office: 123 Market Pl., Baltimore, Md.

ENTERED as second-class matter November 4, 1949 at the Post Office at Baltimore, Md., under the Act of March 3, 1879.

SUBSCRIPTION RATES: United States, 1 year, $3.00; 2 years, $5.00. Canada and Pan American countries, 1 year, $4.00; 2 years, $7.00. All other foreign countries, 1 year, $9.00; 2 years, $15.

SINGLE COPIES: current issue: $0.50; all back numbers $1.00. Postage and handling charges for foreign countries on single copies: $1.00. Claims for missing numbers will not be allowed if received more than 60 days from date of mailing. No claims allowed from subscribers arising from failure to notify the Circulation department of a change of address, or because a copy is "missing from files."

ADVERTISING RATES known on request. Closing date for copy—5th of month preceding month of issue.

DON'T SIGN THAT ORDER!

SAVE MONEY ON 1956 NITROGEN CONTRACTS

Freight represents a high percentage of your costs for nitrogen solutions, anhydrous ammonia and aqua ammonia. The completion of Sinclair's strategically located new plant in Hammond, Indiana, means a sharp reduction in freight costs for many nitrogen users located in the Mid-West.

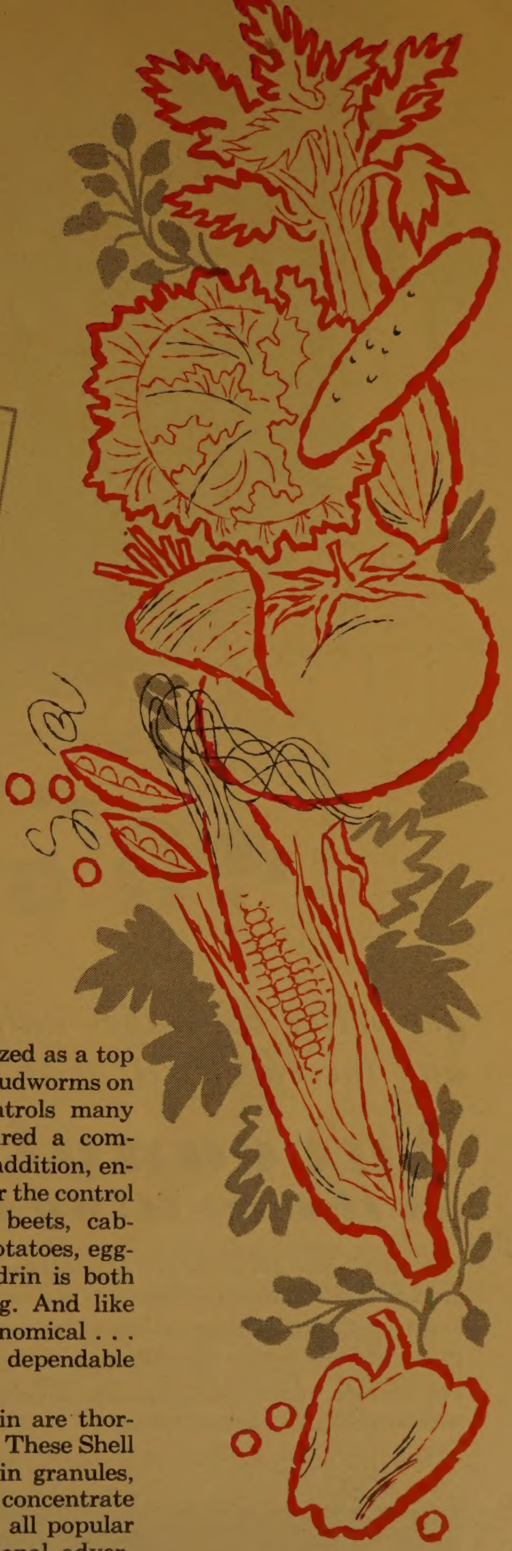
Here's another big advantage! Sinclair's new facilities and vast new storage capacity make it possible to meet *your* production schedule — even during peak season. Two tank car fleets are held in readiness — one for exclusive use in shipping anhydrous ammonia, the other for nitrogen solutions.

So don't sign that contract . . . first find out how this new Sinclair plant in the heart of the Mid-West can cut your costs and delivery time of nitrogen supplies. Write or telephone . . .

SINCLAIR CHEMICALS, INC.

(Affiliate of Sinclair Refining Company)

600 Fifth Avenue, New York 20, N. Y. — Phone Circle 6-3600
155 North Wacker Drive, Chicago 6, Illinois — Phone Financial 6-5900



Now—

aldrin
dieldrin
endrin

control more than 100 different crop insects . . . protect 91 raw agricultural commodities

LATEST residue tolerances give aldrin, dieldrin, and endrin a wider crop coverage than ever before. They can be used on 77 different crops . . . a total of 91 new raw agricultural commodities. And continued research in co-operation with federal, state, and local government agencies promises even wider crop coverage. Cash in on these powerful pesticides by incorporating them into your own formulations.

Aldrin may be used on 91 raw agricultural commodities. It is noted for its fast kill. And aldrin is recognized as an outstanding insecticide for soil insects. Aldrin is economical—mere ounces per acre give dependable control.

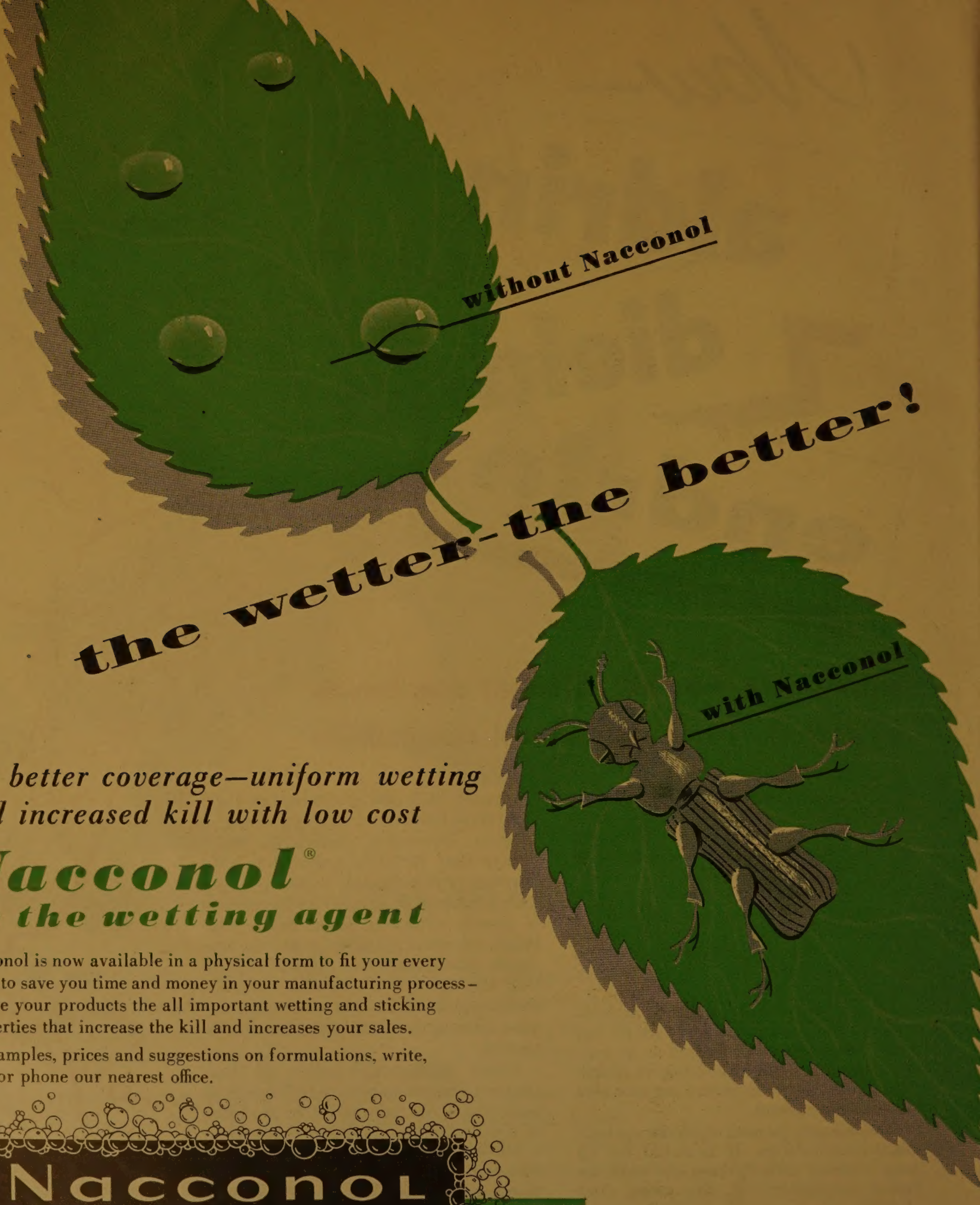
Dieldrin may be used on 85 raw agricultural commodities. It is noted for its long residual effectiveness—is used for insect control in hot, dry areas. And dieldrin is economical—a little goes a powerful long way.

Endrin may be used on 10 raw agricultural commodities. Although comparatively new, it is now recognized as a top control for hornworms and budworms on tobacco. On cotton, it controls many insects that formerly required a combination of insecticides. In addition, endrin is federally registered for the control of insects attacking sugar beets, cabbages, tomatoes, peppers, potatoes, eggplants, and cucumbers. Endrin is both long lasting and fast acting. And like aldrin and dieldrin, it is economical . . . mere ounces per acre give dependable control.

Aldrin, dieldrin and endrin are thoroughly tested and approved. These Shell insecticides can be applied in granules, as a dust, spray, emulsible concentrate or mixed with fertilizer . . . all popular formulations. Powerful national advertising and merchandising pre-sell your customers—help build bigger turnover and profit for you. Complete technical information and latest crop tolerances are available. Write today to:

SHELL CHEMICAL CORPORATION
AGRICULTURAL CHEMICAL SALES DIVISION
460 Park Avenue, New York 22, New York
ATLANTA • HOUSTON • SAN FRANCISCO • ST. LOUIS • NEW ORLEANS

SHELL



get better coverage—uniform wetting and increased kill with low cost

Nacconol®
as the wetting agent

Nacconol is now available in a physical form to fit your every need, to save you time and money in your manufacturing process—to give your products the all important wetting and sticking properties that increase the kill and increases your sales.

For samples, prices and suggestions on formulations, write, wire or phone our nearest office.

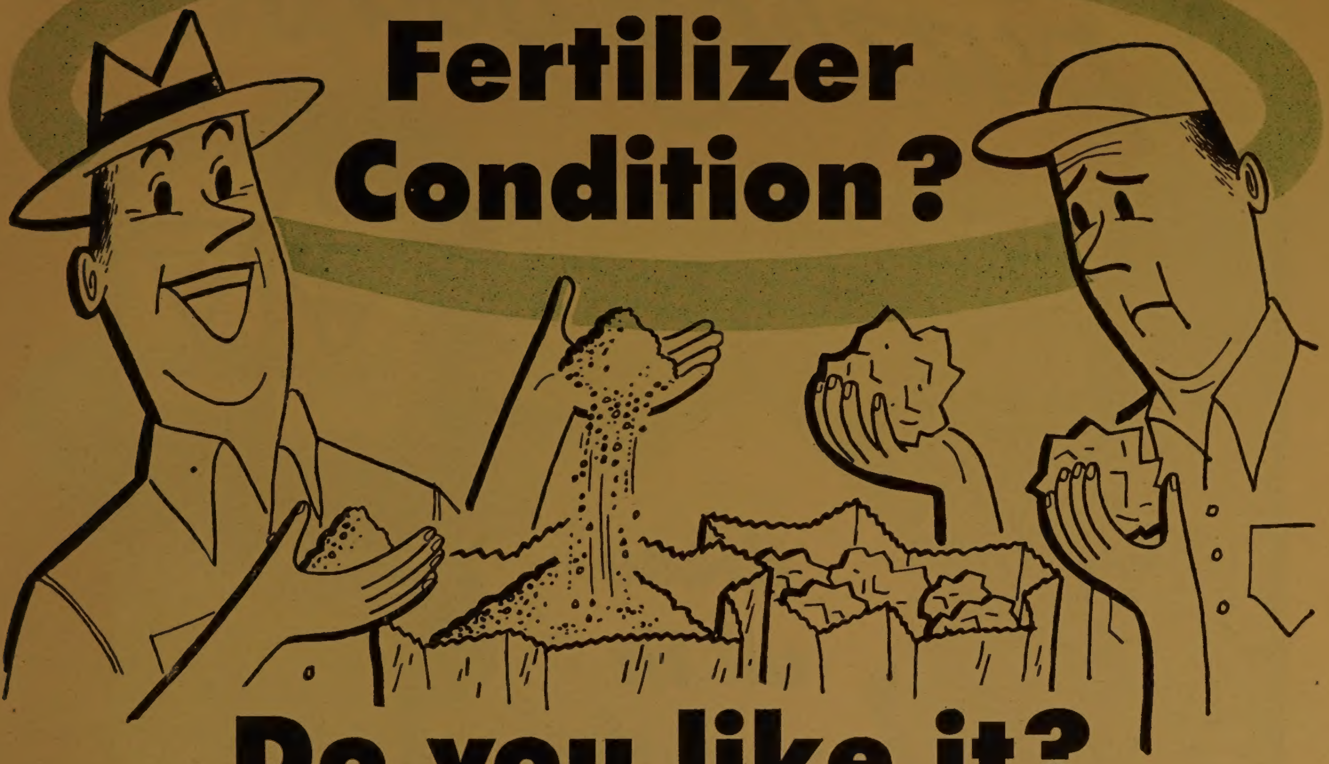
Nacconol

NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N.Y. • HAnover 2-7300

Boston 14, Mass., 150 Causeway St. CApitol 7-0490
Providence 3, R.I., 15 Westminster St. DExter 1-3008
Philadelphia 6, Pa., 200-204 S. Front St. LOmbard 3-6382
Los Angeles 58, Cal., 4814 Loma Vista Ave. LOgan 8-2257
San Francisco 5, Cal., 517 Howard St. SUtter 1-7507
Portland 9, Ore., 730 West Burnside St. Beacon 1853
Chicago 54, Ill., The Merchandise Mart SUperior 7-3387
Cleveland, Ohio, 3121 Euclid Ave. HEnderson 2-2020
Charlotte 1, N.C., 201-203 West First St. EDison 3-9221
Richmond 19, Va., 8 North Fifth St. Richmond 2-1930
Columbus, Ga., Columbus Interstate Bldg. Columbus 7-4512
Greensboro, N.C., Jefferson Stand. Bldg. GReensboro 2-2518
Chattanooga 2, Tenn., James Bldg. CHattanooga 6-6347
Atlanta, Ga., 1216 Spring St., N. W. Elgin 0308
New Orleans 12, La., Carondelet Bldg. Raymond 7228
Toronto 2, Can., 137-145 Wellington St. W. Empire 4-6495

Allied Chemical

How's Your Fertilizer Condition?



Do you like it?

Do you have problems in preventing bag set with some of your fertilizer grades? You can get better condition at no extra cost with ARCADIAN® URANA® Nitrogen Solutions.

Many fertilizer producers are using URANA Nitrogen Solutions to help prevent this caking or lumping. URANA improves condition both for storage and distribution of mixed fertilizers. The ammonium chloride salts crystallize as cubes instead of in the shape of needles or ferns. These cubes do not bind or cake the granules together. You produce well-cured fertilizer that maintains better condition. Furthermore, Urana Solution supplies another nitrogen source – urea or water soluble organic nitrogen.

You can now get URANA 15 (15% urea), URANA 12 (12% urea), URANA 10 (10% urea) and other URANA Solutions at the *same* price for nitrogen as ARCADIAN NITRANA® and U-A-S* Solutions. NITRANA and U-A-S Nitrogen Solutions and N-dure* Urea-Formaldehyde Solution also provide important conditioning advantages. For detailed information, call a Nitrogen Division technical service representative.

Arcadian®

NITROGEN DIVISION Allied Chemical & Dye Corporation

New York 6, N. Y. • Hopewell, Va. • Ironton, Ohio • Omaha 7, Neb.
Kalamazoo, Mich. • Columbia 1, S. C. • Atlanta 3, Ga. • Indianapolis 20, Ind.
Columbia, Mo. • St. Paul 4, Minn. • San Francisco 4, Cal. • Los Angeles 5, Cal.

NITROGEN DIVISION ALLIED CHEMICAL

Nitrogen Solutions: NITRANA® • URANA® • U-A-S* • N-DURE*

Other Nitrogen Products: Anhydrous Ammonia • Urea Products • A-N-L® • Sulphate of Ammonia

*Trade-mark

PROCESSING TROUBLES *puzzling you?*

Solving any puzzle is more easily achieved if key parts can be determined. As a carrier and diluent for insecticides, fungicides, sprays and dusts, Diluex and Diluex A exceed the most exacting qualifications of the agricultural chemical formulators.

Diluex and Diluex A are basically an aluminum magnesium silicate mineral, having an amphibole-like structure possessing a large adsorption capacity in liquid impregnation procedures used in processing the newer complex organic insecticides. Both products are widely accepted as superior grinding or milling aids for technical grade toxicants such as DDT and BHC and will discharge readily from commercial dust applicators giving uniform coverage and minimum fractionation of toxicant and carrier in the swath.

Write for complete specifications and samples; our technicians are available to help with your processing operations.

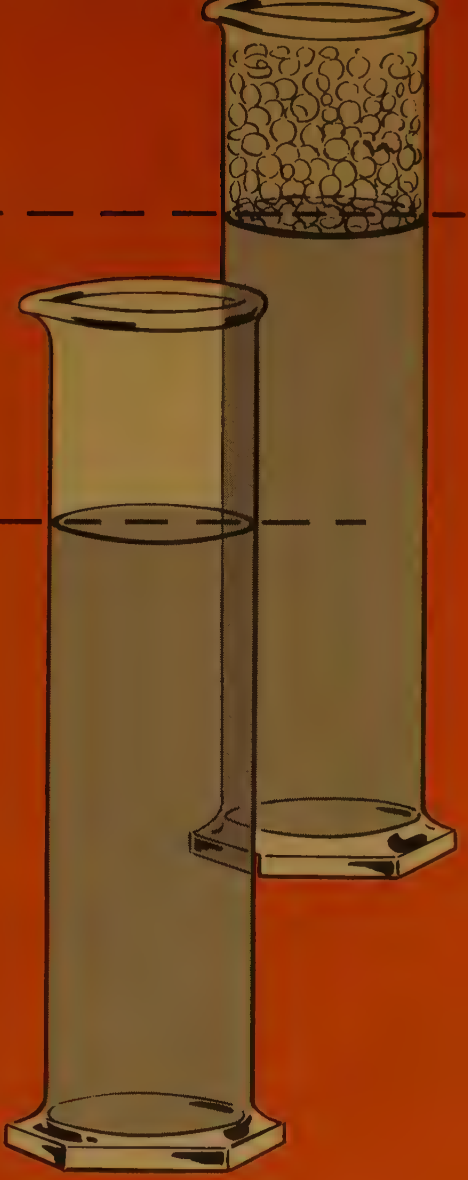
GRANULAR PESTICIDE FORMULATIONS

Adsorptive FLOREX granules offer a superior base for granular soil pesticides, mosquito control formulations and insecticide-fertilizer additives. Available in standard meshes 30/40, 30/60, and 16/30. Special meshes tailored for experimental formulas.

FLORIDIN COMPANY

Adsorbents
Desiccants
Diluents

DEPT. M. P. O. BOX 989, TALLAHASSEE, FLORIDA



End Foam!

with the **TOXIMUL Emulsifier Twins**

TOXIMUL H . . . TOXIMUL L

Troublesome foam-over in spray rigs and airplane tanks can now be eliminated by the use of this new pair of *TOXIMUL* emulsifiers, either separately or blended together.

Particularly when using kerosene or xylene-type solvents, *TOXIMUL* H and *TOXIMUL* L impart unusual spontaneity and stability to emulsions—*without foam*—thus giving your product important sales advantages.

TOXIMUL H is used by itself with Toxaphene and Chlordane, *TOXIMUL* L with Dieldrin. By blending the two, excellent emulsification of DDT, BHC, Aldrin, Endrin and Heptachlor is obtained over a wide range of water hardness.

Since 1951, the *TOXIMULS* have steadily grown in popularity among leading insecticide formulators, because of their combination of high efficiency and low cost. These new *"TOXIMUL Twins"* represent one more forward step in better, more practical insecticide formulation. Get all the facts about them without delay.

ALSO:

TOXIMUL P—specifically developed as an efficient emulsifier for Parathion.

TOXIMUL MP—a highly effective emulsifier especially designed for use in Malathion formulations.

TOXIMUL 250—for emulsifying Pentachlorophenol and CIPC.

NINOL Detergents— —Emulsifiers

★ **WRITE TODAY FOR BULLETINS, SAMPLES**

SEND THIS COUPON NOW

NINOL LABORATORIES, INC.
DEPT. A
PRUDENTIAL PLAZA
CHICAGO 1, ILLINOIS

Gentlemen: Please send working samples of and complete information about the *TOXIMULS* checked:

☐ H & L—for Xylene and Kerosene formulations
☐ P—for Parathion formulations
☐ MP—for Malathion formulations
☐ 250—for Pentachlorophenol and CIPC formulations

Signed ____
Co. ____
Street ____
City & State ____

NINOL LABORATORIES, INC.
PRUDENTIAL PLAZA • CHICAGO 1 • PHONE WHITEHALL 4-6323
In Canada Chemical Developments of Canada Ltd., 420 Lagauchetiere Street W., Montreal 1, Quebec

Man feeds the land

The importance of nitrogen to the soil is well known. Our agricultural chemicals industry is meeting the nation's rapidly expanding need for this essential element through increased production of ammonia. Applied in fertilizers, or directly into the soil, ammonia is doing much to revitalize the tired earth.

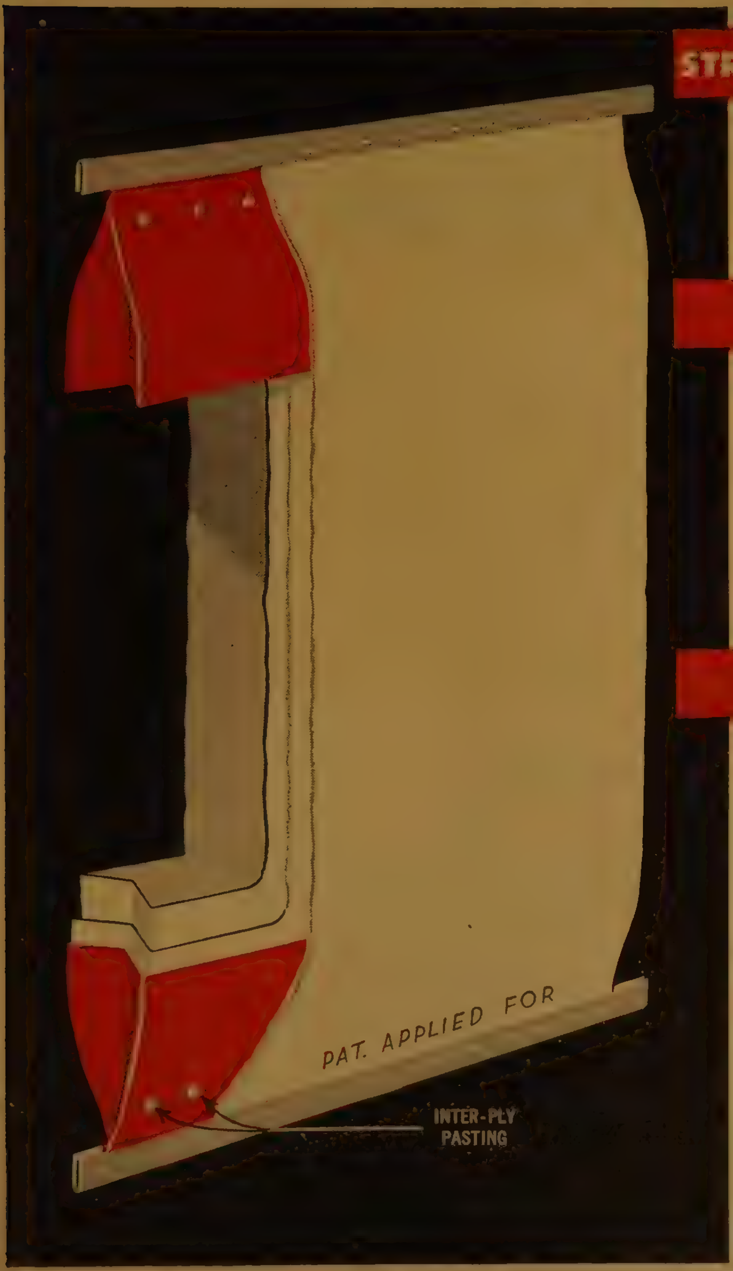
Lummus is currently engineering and constructing a number of ammonia plants in widely separated parts of the world. Our experience, which covers over a half century, is broad in chemical plants and petroleum refineries. Perhaps our staff and facilities can complement your own on *your* next project.

THE LUMMUS COMPANY, 385 Madison Avenue, New York 17, New York. *Engineering and Sales Offices:* New York, Houston, Montreal, London, Paris, The Hague, Bombay. *Sales Offices:* Chicago, Caracas. *Heat Exchanger Plant:* Honesdale, Pa. *Fabricated Piping Plant:* East Chicago, Ind.

LUMMUS

DESIGNING ENGINEERS AND CONSTRUCTORS FOR THE PETROLEUM AND CHEMICAL INDUSTRIES

New *Strength-end* *
Bemis Multiwalls
the shipping sack with BALANCED STRENGTH



STRONGER AT THE RIGHT PLACES

New Bemis Strength-End Multiwalls, strengthened top and bottom where most sewn bag breakage is experienced, will cut packing troubles and costs for you.

TWO WAYS TO SAVE

You'll save money one of these two ways with Bemis Strength-End Multiwalls: You may switch from a more expensive type of shipping container. Or, if you are already using multiwalls, you might use bags with fewer plies, because of the greater end strength, where it is needed. Bemis Strength-End Multiwalls may, at lower cost, do your job as well or better.

SUCCESSFULLY TESTED

Bemis Strength-End Multiwalls have been successfully tested in all sections of the country and under all climatic conditions. They have proved themselves for packing cement, fertilizer, chemicals, flour, salt.

Here's how it's reinforced

The reinforcement in Bemis Strength-End Multiwalls is a strip of sturdy kraft, several inches wide, running horizontally around the bag at the ends . . . anchored to the other walls so it works in conjunction with them . . . and adding greatly to the strength both at the sewing line and at the gusset corners. It's just plain, common-sense, balanced strength construction.

*TRADE-MARK

Get the complete story about Bemis Strength-End Multiwalls from your Bemis Man.

Bemis

BEMIS BRO. BAG CO.

General Offices—St. Louis 2, Mo.
Sales Offices in Principal Cities

Now It's EASY To Have Clean Tobacco Beds with

WHEN YOU BUY Niagara YOU BUY PROTECTION

BEDRENCH

NO PLASTIC COVERS—NO SPECIAL APPLICATORS REQUIRED

STOPS WEED and GRASS GROWTH

CONTROLS DISEASE (damping-off and others)

DESTROYS NEMATODES

KILLS SOIL INSECTS

Just Drench Beds Before Planting

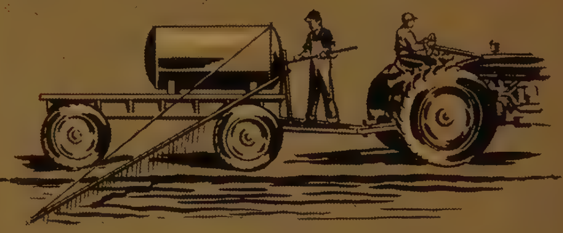
Want to eliminate hand weeding? Want to improve your rate of seedling emergence? Want to raise healthy tobacco plants that thrive in fumigated soil; plants that are free from disease, nematode or insect attack? Want to treat all your seed beds at one time? Then you want Bedrench. It's an exclusive Niagara formula. Just mix with water and drench into your prepared seed beds.

Bedrench is easy to apply (see diagrams). You can do it anytime—up to within 10 to 12 days before planting.

Proved by Leading Growers and State Experiment Stations

The effectiveness of Niagara Bedrench has been thoroughly proved. It's in stock and ready to go to work for you now.

HERE'S HOW EASY YOU CAN DO IT!



DRENCHING BED BY GRAVITY FLOW THROUGH BOOM

SMALL BED APPLICATION

NONE OF THIS!

Niagara CHEMICAL DIVISION

Food Machinery & Chemical Corporation
Middleport, N.Y.   Jacksonville, Fla.

fmc WHEN YOU BUY Niagara YOU BUY PROTECTION
*Trade Mark

*Our Land depends
on those
who build
and conserve
soil fertility*

DUVAL

*HIGH GRADE
MURIATE OF POTASH*

will help do the job!

High Analysis · Unsurpassed Service

**DUVAL SULPHUR
and
POTASH CO.**
Modern Plant and Refinery at Carlsbad, New Mex.

Address all communications to
ASHCRAFT-WILKINSON CO.
Exclusive Distributors
ATLANTA, GEORGIA
Cable Address: Ashcraft

Norfolk, Va. Charleston, S. C. Tampa, Fla. Jackson, Miss. Columbus, Ohio Montgomery, Ala.

PENCO DEFOLIANTS AND DESICCANTS

ENDOTHAL*

DE-FOL-ATE

PENITE-6X

PENTA CONCENTRATE 40

DESICCANT L-10

*Endothal is the accepted generic name for 3, 6 endoxohexahydrophthalic acid. The manufacture and use of endothal products are covered by one or more of the following U. S. patents 2,550,494; 2,576,080, 2,576,081, 2,576,083, other pats. pend.

THROUGH pioneering research and development of defoliants and desiccants, PENNSALT has become a leader in this field of agricultural chemicals. Because chemical harvest aids make harvesting easier, more economical and, therefore, more profitable, the use of these products is rapidly increasing. Through technical development, PENNSALT is constantly striving to improve its widely used defoliants and desiccants. In the meantime, in seeking a *perfect* defoliant, several candidates are being field tested. The newest one is PENCO DESICCANT L-10, which is available only in Texas this season for use on cotton.

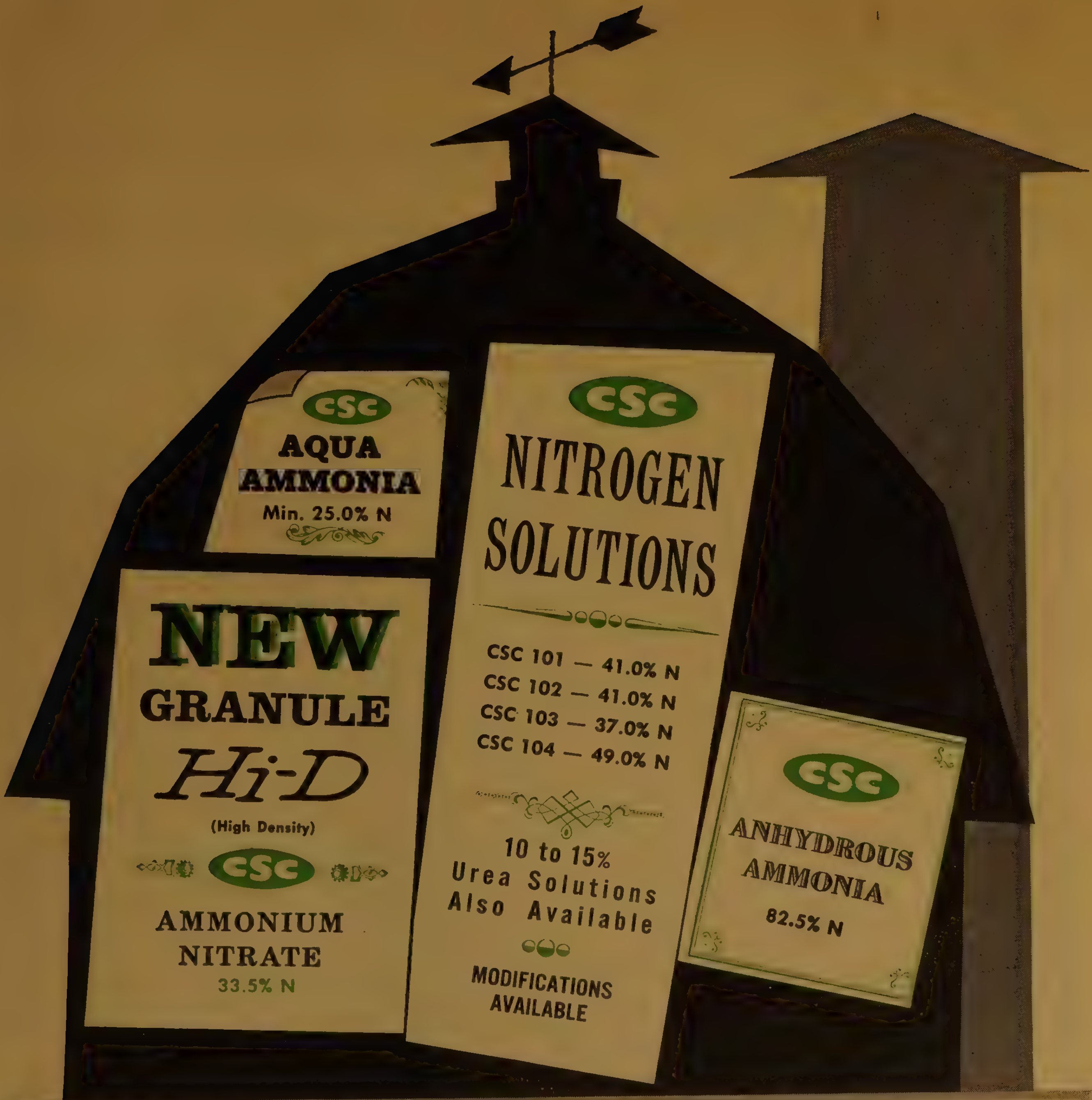
So, for increased sales and profits, stock the broad line of PENCO defoliants and desiccants. Write your nearest PENNSALT CHEMICALS office for service bulletins.

PENNSYLVANIA SALT MANUFACTURING COMPANY OF WASHINGTON

AURORA, ILL. TACOMA, WASHINGTON BRYAN, TEX.
Berkeley, Calif. Los Angeles, Calif. Montgomery, Ala. Portland, Ore.

Producing Chemicals for Farm, Home and Industry for Over 105 Years

Pennsalt Chemicals



CSC offers low-cost nitrogen for every need

Commercial Solvents Corporation is currently producing and supplying fertilizer manufacturers with the important forms of nitrogen. The liquid forms are widely used for the preparation of high-analysis fertilizers and for the ammoniation of superphosphates. The *new granule* Hi-D (High Density) CSC Ammonium Nitrate Fertilizer, an exclusive free-flowing, low moisture form of ammonium nitrate, is distributed entirely through fertilizer manufacturers.

Prompt service from these District Offices:

ATLANTA 8, GA:
344 Williams St., N. W., JAckson 5-6996

ST. LOUIS 17, MO:
7890 Folk Ave., MIssion 5-3330

STERLINGTON, LA:
STerlington 3451

AGRICULTURAL CHEMICALS DEPARTMENT • **COMMERCIAL SOLVENTS CORPORATION**
260 Madison Avenue, New York 16, N. Y.

NITROGEN the Heart of the Harvest

Now—for direct application . . .

highest quality...
granulated triple super

Just one trip across the field with this dustless, easy-to-handle, granulated 0-45-0 will make a repeat customer out of a trial user. Cash in now on fall sales.

Builds customer satisfaction and repeat sales

You'll like the compliments you'll get after your customers have tried your new 0-45-0 from International for the first time.

Look at typical comments from users of this high-quality triple:

"It sure goes on easy." (You bet it does! It's granulated for easy going through any fertilizing rig.)

"Pleasure to use." (Yes . . . and just one downwind trip across the field will prove it to anyone . . . will build more repeat sales than a dozen sales talks.)

"Saves time and money." (Now your customers can avoid breaking up lumps in the bag or stopping in the middle of a field to kick a clogged-up rig. Easy to handle . . . just fill the fertilizer hopper and push off. Easy to put on.)

What's more, agronomists can tell you the high availability of this superior product delivers results that build farmer satisfaction and repeat sales. The reason: special processing and manufacturing care produces a triple that resists reversion in the soil . . . supplies growing plants the phosphorus they need when they need it.

Call or write International today for samples and complete details.

free-flowing...top-performing that sells itself on sight

*bagged under your own label... shipped direct to your dealers**

Here's a new triple super you'll be proud to add to your own line of fertilizers . . . the new, granulated 0-45-0 from International Minerals and Chemical.

This superior triple can be shipped in bulk, or International will be happy to have it bagged in adequate quantities under your own label . . . ship direct to your own dealers, too, if you like.

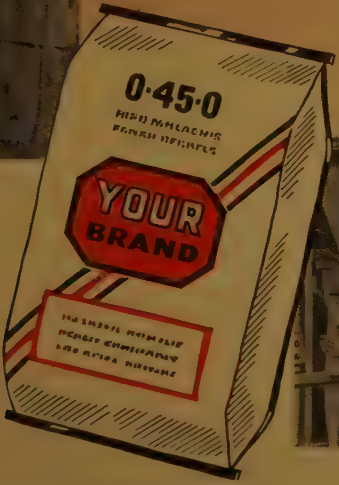
Here's what this can mean to you:

- A top-quality triple super that carries your own private label and complements the rest of your line.
- A modern, easy-to-use, top-performing triple super that will bring you increased customer satisfaction and plenty of repeat sales.
- The unbeatable convenience of distributing this high-quality product under your own brand name direct to your dealers without touching a single bag.

What's more, you'll find that dealing with International is a pleasure. You'll appreciate the friendly cooperation from International's transportation department . . . the fast service . . . and the reliability of supply.

See your International triple-super sales representative soon for complete details on minimum order requirements, price and delivery information. He'll be glad to show you samples. And one look at this new 0-45-0 will show you why you can't get a better deal than this new triple super now available for direct application sales.

**subject to minimum order requirements*



Profit now from this superior 0-45-0. Bagged under your own brand name.

Superior texture of this new triple super, put up in your own bags, stores without caking. It's granulated for easy going through any fertilizer attachment.

PHOSPHATE CHEMICALS DIVISION

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago 6

For better wettable powders

USE

IGEPON

to help fight farm pests

GEPON T-77

IGEPON T-73

IGEPON AP-78

IGEPON T-77, T-73 and AP-78 are particularly recommended for the formulation of dry mixtures of wettable biocidal powders because they can be ground in without objectionable caking and also because they give your products the added advantage of—

Faster Wetting • Stable Dispersion • Controlled Foaming

in either hard or soft water. Let us recommend the IGEPON which is best suited to your particular requirement.

GEPONS can be used in herbicides and insecticides including DDT, 2,4-D, 2-4-5-T, BHC, Lindane, Chlordane, Dieldrin, IPC, Potassium Cyanate, Parathion, Aldrin, Sulfur, and Toxaphene.

You can do it better with an IGEPON

Write today for our new brochure on the complete IGEPON line.

From Research to Reality

ANTARA CHEMICALS
A SALES DIVISION OF GENERAL ANILINE & FILM CORPORATION
435 HUDSON STREET • NEW YORK 14, NEW YORK
SALES OFFICES: New York • Boston • Providence • Philadelphia • Charlotte • Chattanooga • Chicago
Portland, Ore. • San Francisco • Los Angeles • IN CANADA: Chemical Developments of Canada, Ltd., Montreal

ANTARA
gaf

SEE NO WEEVIL...SPEAK NO WEEVIL...HEAR NO WEEVIL

Frontier BHC

13% TO 15% GAMMA CONTENT . . . ALSO 36% HIGH GAMMA

We have recently enlarged our production of the standard 13% to 15% gamma content BHC, and have installed new facilities for producing 36% gamma content BHC for technical requirements. Many users have found it advantageous to buy from this strategically located source in Mid-America, where service to the customer stands foremost. We make no finished insecticides in competition with our own customers. For guaranteed deliveries, we suggest that you contract your 1957 requirements now. It will be our pleasure to serve you . . . dependably.

FRONTIER
CORPORATION
INSECTICIDE CHEMICALS

FRONTIER CHEMICAL COMPANY
DIVISION OF UNION CHEMICAL & MATERIALS CORP.
MUNICIPAL AIRPORT • WICHITA, KANSAS

SALESMEN... to help boost YOUR profits!

Beat the Cost-Price Squeeze!
each $1 properly invested in
LION AMMONIUM NITRATE
will return $3 to $4 on the average corn crop
LION AMMONIUM Nitrate FERTILIZER
LION OIL COMPANY
EL DORADO ARKANSAS
Extra profits for you are
MIXED FERTILIZER
NPK

LION Advertisements Sell LION Nitrogen, *and* Your Mixed Goods, Too!

Continuous Lion advertising appears in leading farm publications, month-after-month, to pre-sell the Lion brand to farmers—and to sell the value of *your mixed fertilizers as well!*

Current advertisements are appearing in Farm and Ranch-Southern Agriculturist, Progressive Farmer, The Farmer, Nebraska Farmer, Kansas Farmer, Prairie Farmer, Wallace's Farmer & Iowa Homestead, Wisconsin Agriculturist and Farmer, Missouri Ruralist and Missouri Farmer. All of these advertisements are in color.

Each Lion advertisement promotes the economic benefits of properly using fertilizers, including Lion Ammonium Nitrate, to help increase the farmer's profits. Each advertisement sells *hard* on the importance of soil tests in the intelligent use of all commercial fertilizers. Lion, a leader in nitrogen production, leads the way to good fertilization practices . . . to better profits for you!

LION'S QUALITY LINE OF NITROGEN FERTILIZER MATERIALS

LION ANHYDROUS AMMONIA—82.2% nitrogen. Quality guaranteed.
LION AQUA AMMONIA—Ammonia content above 30%—other grades to suit your requirements.
LION AMMONIUM NITRATE FERTILIZER—Improved spherical pellets. Guaranteed 33.5% nitrogen.
LION NITROGEN FERTILIZER SOLUTIONS—Various types to suit your particular manufacturing needs.
LION SULPHATE OF AMMONIA—White, uniform, free-flowing crystals. Guaranteed 21% nitrogen.

LION OIL COMPANY

A DIVISION OF MONSANTO
CHEMICAL COMPANY

LION

EL DORADO, ARKANSAS

DISTRICT SALES OFFICES: Lion Oil Building, El Dorado, Ark. • Insurance Exchange Building, Des Moines, Ia.
National Bank of Commerce Building, New Orleans, La. • 1401 Building, Atlanta, Ga.

"We found Multiwall Bags with ALL-TEMP Best!

"Our Production and Packaging men have expressed a definite preference for them.

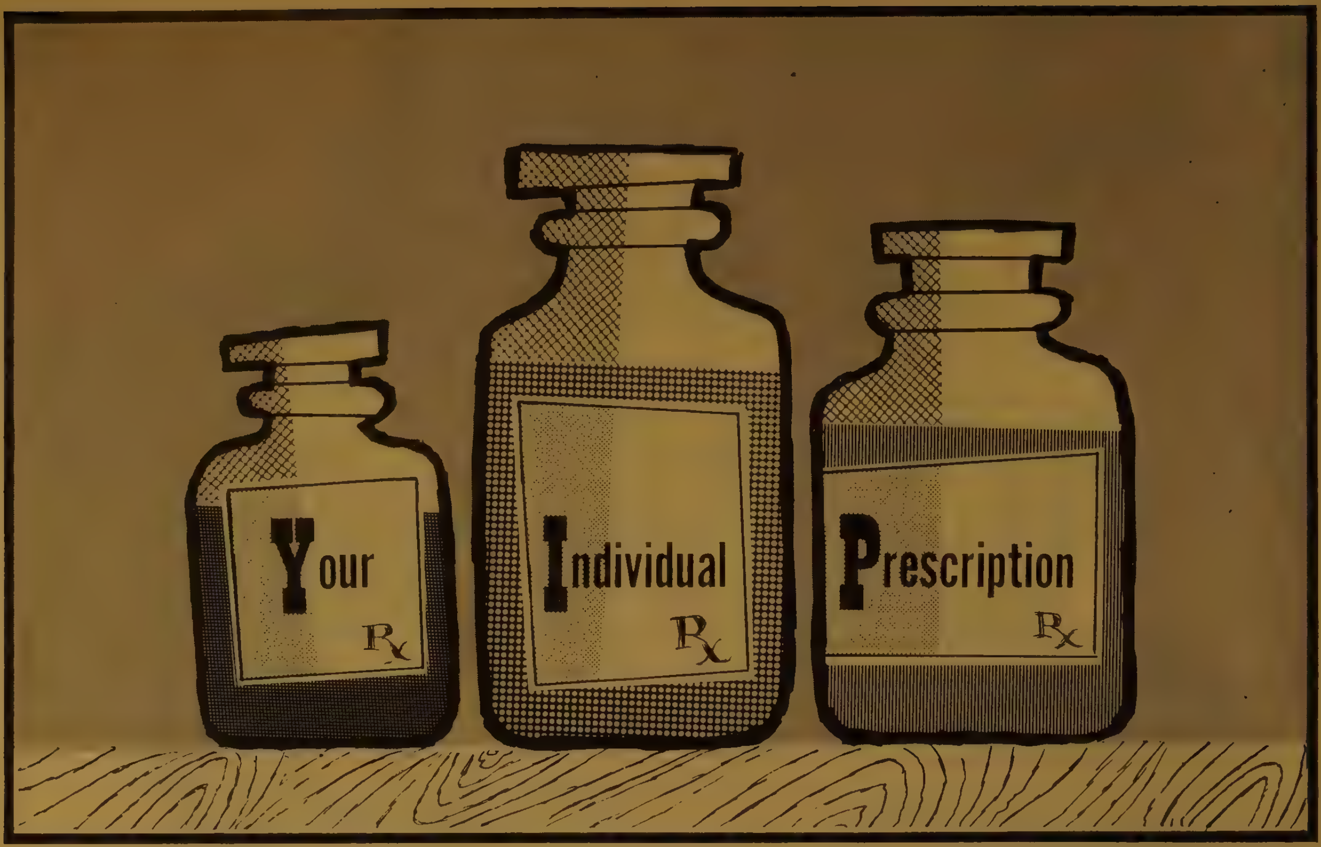
"Most important, our customers recognize the advantages that ALL-TEMP LAMINANT gives in moisture protection and in reducing the problem of bags becoming rigid and cracking when stored in unheated warehouses."

Trying samples is the best way to prove that when you buy "Arksafe" MULTIWALL BAGS you're getting the best package.

ARKELL SAFETY BAG COMPANY

(Est. 1896)

10 East 40th Street, New York 16, N. Y. • 6345 West 65th Street, Chicago 38, Ill.
Plants: Chicago, Illinois and Newport News, Virginia



...to fit your special needs in HI or LO-Volatile ester emulsifiers

Hi or lo-volatile esters of 2,4-D or 2,4,5-T are unique in their individual composition, compatability, formulating range, and dilutability with water and oils. Each requires an individual "prescription" for effective emulsification.

You can get this individualized Emulsol treatment because our "prescription" department is set up to compound for your herbicide ester requirements (even for tank car shipments) a special EMCOL emulsifier and at no premium price.

That's why so many top-flight formulators look to Emulsol. You too will find a solution to your herbicide formulation problem by contacting your local Emulsol representative or by communicating with us directly.

Emulsol

EMULSOL CHEMICAL CORPORATION
division of Witco Chemical Company
59 EAST MADISON STREET • CHICAGO 3, ILLINOIS, U.S.A.

Fertilizers won't cake—flow freely in the field

Many a farmer has been cursed by the serious caking problem which so often occurs when deliquescent fertilizers are stored in damp or humid conditions. And many a formulator has learned that this can easily be prevented by using Celite*. These tiny particles of diatomite surround the fertilizer crystals or prills with a protective coating that can prevent contact between them and thus minimize caking.

At the same time Celite fillers improve flowability. The particles are not only microscopic in size but extremely irregular in shape. Thus Celite coated fertilizers flow more freely. As little as 2% of Celite assures more uniform application in the field.

A Celite engineer will gladly help you put the right grade to work in your fertilizer. Just phone him at your nearest Johns-Manville sales office or write Johns-Manville, Box 60, New York 16, New York. In Canada, address 565 Lakeshore Road East, Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products

when formulated with

CELITE

diatomite fillers

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville CELITE

INDUSTRY'S MOST VERSATILE MINERAL FILLER

Multiplier of crop yields

Anhydrous ammonia offers a rapid and economical means of raising the nitrogen level of the soil. Corn growers, for example, report that for each dollar's worth of anhydrous ammonia (properly applied), they can expect a yield of as much as five extra bushels of corn.

The Atlantic Refining Company is a prime source of supply for many companies using anhydrous ammonia. For detailed information on this and other Atlantic petrochemicals, write the Atlantic office nearest you. The Atlantic Refining Company, 260 South Broad Street, Philadelphia 1, Penna.

ATLANTIC
PETROLEUM
CHEMICALS

Philadelphia, Providence, Charlotte, Chicago

In the West: L. H. Butcher Co.

In Canada: Naugatuck Chemicals Division of Dominion Rubber Company, Ltd.

In Europe: Atlantic Chemicals SAB, Antwerp, Belgium

J-9

New Home of Geigy Agricultural Chemicals

● Geigy Agricultural Chemicals' modern new headquarters now combine administrative offices, service facilities, and chemical research and development laboratories.

All of these facilities in one location constitute another step forward to serve you better and more efficiently.

GEIGY AGRICULTURAL CHEMICALS • *Division of Geigy Chemical Corporation* • **Saw Mill River Road, Ardsley, New York**
Mail address: P.O. Box 430, Yonkers, New York
Telephone: HAstings 5-8211

DIAZINON

The most effective residual fly control chemical available. One spraying kills flies from 4 to 6 weeks.

METHOXYCHLOR

General purpose insecticide. For control of insect pests of livestock, crops, and stored grain. Safe to use. Long residual action.

CHLOROBENZILATE

Safe, effective miticide. Controls mites on apples, pears, citrus, and ornamentals. Long residual action.

SEQUESTRENE*

Original iron chelates for correction of iron deficiency (chlorosis) in ornamentals, fruit trees, vegetables, and turf.

*"SEQUESTRENE" is the brand name for metal chelates sold by Geigy Agricultural Chemicals, Division of Geigy Chemical Corporation

DDT

Controls a variety of insect pests of man and animals. Equally effective against many insects attacking ornamentals and agricultural crops.

Geigy *ORIGINATORS OF DDT INSECTICIDES*

GEIGY AGRICULTURAL CHEMICALS • *Division of Geigy Chemical Corporation* • **Saw Mill River Road, Ardsley, New York**

Grace
urea prills

highest nitrogen content 45%

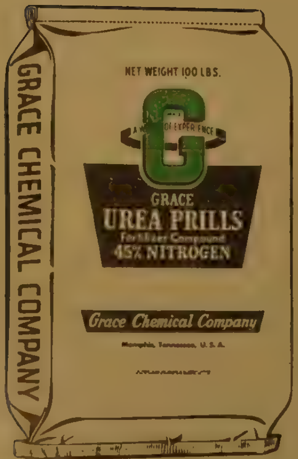
most versatile nitrogen fertilizer

Sure source of profit on resale

Wherever nitrogen is needed, Grace Urea Prills are effective and recommended. For *no other* solid fertilizer offers more nitrogen per pound to the soil. This alone makes Grace Urea Prills a sure resale item for you.

Best source of nitrogen for your mixed fertilizers

Grace Urea Prills improve the effectiveness and physical condition of your mixed fertilizers. Grace Urea Prills are an effective conditioner. Fertilizer mixtures with Grace Urea Prills have a softer, crumbly texture. And Grace Urea Prills are your superior source for nitrogen in mixed goods.



memphis
tennessee

W R GRACE & CO

Grace
chemical co.
DIVISION OF W. R. GRACE & CO.

Flies can't read...

but CRAG Brand Fly Repellent keeps them off

Flies learn in a hurry that they're not wanted when cattle are sprayed with formulations containing CRAG Fly Repellent. Your customers will earn bigger profits because cattle protected by sprays based on CRAG Fly Repellent give more milk or beef.

Your profits will go up, too, because satisfied customers will come back for more of their favorite spray based on CRAG Fly Repellent.

Find out how you can formulate top-quality livestock sprays with CRAG Fly Repellent. Sample labels and other information are available. Fill in and mail the coupon now!

"Crag" is a registered trade-mark of Union Carbide and Carbon Corporation.

CARBIDE AND CARBON CHEMICALS COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, New York

CRAG BRAND AGRICULTURAL CHEMICALS

Please send me information on CRAG Fly Repellent in:

☐ Oil Sprays ☐ Emulsifiable Concentrates ☐ Back Rubber Concentrates
☐ Treadle Sprays ☐ Pressurized Sprays

Name..

Company..

Address...

City...Zone..........State.............

ATLOX® EMULSIFIERS

They deliver the kind of performance that builds big volume in repeat sales

Choose ATLOX emulsifiers and your concentrate will deliver a walloping haymaker instead of a puny slap. With ATLOX emulsifiers in your formulas, your concentrates will give your customers top flight performance regardless of their requirements on dilution rates, water hardness or methods of application.

Whether for insecticide, herbicide or spray oil, there's an ATLOX emulsifier that is exactly right for you . . . and your customers' needs.

They've got everything it takes to help you put more sell in your concentrates. ATLOX emulsifiers are thoroughly lab-tested, field-proved, and backed by long experience in the agricultural field.

We'll be glad to send along all the help you need with your emulsifying problems. Call or write Atlas today.

CHEMICALS
DIVISION
ATLAS
POWDER COMPANY
WILMINGTON 99, DELAWARE

In Canada: Atlas Powder Company, Canada, Ltd.
Brantford, Ontario, Canada

make concentrates mean business

LEADING GROWERS OF MANY CROPS DEPEND ON TOXAPHENE FOR SEASON-LONG INSECT CONTROL. FOR EXAMPLE, TOXAPHENE IS OFFICIALLY RECOMMENDED FOR CONTROL OF MORE COTTON INSECTS THAN ANY OTHER INSECTICIDE.

Agricultural Chemicals Division
Naval Stores Department
HERCULES POWDER COMPANY
970 Market Street, Wilmington 99, Del.

NX 56-11

Editorial COMMENTS

THE 1956 season, now in its closing stages, has apparently been a much better than average year for sale of pesticides. It failed to live up to some of the more optimistic advance predictions, of course, but volume-wise, price-wise and profit-wise, it was the best year in a long while for pesticide manufacturers. This was in rather sharp contrast to 1955, when tonnage figures may have been satisfactory but profit margins were small because of the demoralized price situation in the industry.

Elsewhere in this issue (See pages 39-42) we summarize reports on 1956 insecticide business from a group of insecticide manufacturers and formulators who are closely in touch with the market on a nation-wide basis. In general, their comments are quite favorable. "1956 has been an exceptionally good year." "Our sales are about 15% ahead of last year." "Pesticide business in the southeastern states shows considerable improvement over 1955." "The year has been very good for DDT sales." "The pesticide industry will enjoy a record sales volume in 1956." "My company has enjoyed an appreciable increase in business in 1956 over every previous year of operation."

Lest the casual reader get the impression that all has been a soft bed of roses, however, we must hasten to add that there have been bad spots too. In the southwest a recurrence of drought conditions cut the cotton crop, and as a direct result limited use of cotton pesticides, particularly in mid and late season. In the southeastern states dry weather in some areas also made the pesticide application season shorter than had been anticipated on the basis of early-season insect counts. Where there was adequate moisture to grow crops, demand for pesticides was good. Where it was hot and dry, demand as usual was light.

An encouraging note for 1957 is the reported light status of carryover stocks. Buying this season was light in advance of actual need, and most dealers did not order out supplies until they actually needed them. As a result there will be no bulky carry over of materials manufactured for 1956 use to depress the 1957 market, from the reports that have reached us.

Another encouraging note is the fact that a number of formulators report that purchase and use of pesticides this season has apparently been distributed more evenly through the growing season than in many previous years. Instead of waiting for serious outbreaks to occur, and then ordering out emergency stocks of pesticides, some farmers at least seem to be adopting the idea of regular, planned pesticide use as a normal cultural practice. The growth of such a trend would do much to stabilize the pesticide market for the future.

The worst feature of pesticide sales, which all seem to agree urgently needs correction, is the prevalent practice of consignment selling. Sales entered on the books in June and July can become returns in September and October, turning black figures to red, adding to carryover stocks and demoralizing sales staffs. A full discussion of the ills of consignment selling could very logically feature the open discussion of pesticide sales scheduled for the coming meeting of the NACA.

Farmers profit 6 ways from plow down

—with Cyanamid

"Agriculture's most useful form of nitrogen"

1. Farmers get MORE HUMUS, FASTER from cover crops and crop wastes by plowing them down with free-flowing Cyanamid.

2. Cyanamid supplies necessary lime. Cyanamid contains the equivalent of 70% hydrated lime, as well as 20% of the right kind of nitrogen. Farmers need this lime to neutralize soil acidity. And these are the proper proportions of nitrogen and lime to form a maximum of humus from the organic material plowed down.

3. The 20% nitrogen in Cyanamid resists leaching . . . is available to crops from plow down until harvest, come drought or heavy rains. This "staying" quality of Cyanamid nitrogen permits plow down *at any time of year.*

4. Plow down with Cyanamid places nitrogen in the root zone where it can be used by the plants. It encourages deeper rooting, helps crops withstand drought.

5. Using Cyanamid AVOIDS the reduction in yield which often follows plow down of crop wastes and mature cover crops alone.

6. Production costs go down, because Cyanamid eliminates the expense of side- or top-dressing.

MAKE SURE YOU PROFIT, TOO . . . by selling AERO® Cyanamid, Granular—agriculture's most useful form of nitrogen. Every one of the advantages above is a potent sales argument, a convincing reason why Cyanamid for plow down is an agricultural "best seller."

Write today for complete information

AMERICAN Cyanamid COMPANY

AGRICULTURAL CHEMICALS DIVISION

30 Rockefeller Plaza, New York 20, N. Y.

Producers of:

AERO® Cyanamid: Fertilizers—Defoliants—Herbicides
AEROPRILLS® Fertilizer Grade Ammonium Nitrate
AERO® Ammonium Sulphate
ANHYDROUS AMMONIA
PHOSPHATES for Acidulation and Direct Application
THIOPHOS® Parathion Technical
MALATHION Technical
CYANOGAS® Calcium Cyanide Fumigants
HCN Fumigants
POTASSIUM CYANATE Weedkiller for Agriculture and Turf

A tremendous potential for agricultural chemicals

By W. W. Allen

Dow Chemical Co., Midland, Mich.
President: National Agricultural Chemicals Association

W. W. Allen

AS I prepare to vacate the office of president of the National Agricultural Chemicals Association, I note with a great deal of satisfaction that our industry is rapidly becoming a mature part of the national life. Historically, this industry began as a sideline with chemical companies or in some cases with individuals. Research in the modern sense had not been thought of. Production was inefficient, and clear cut studies of the effects and actions of chemicals were far in the future.

People noticed that chemicals did things nothing else could do. When no kind of magic or good management would protect the potato crop from widespread blight, or grapes from black rot, chemicals did. By their very effectiveness, chemicals won a place in agriculture. Important though it was, growth was slow and uncertain until recently.

Agriculture became more important. More people moved to the cities, and those who remained on the farm had to produce more crops efficiently to stay in business. Chemicals came into widespread use for control of insects, plant diseases, and to a small extent, weeds.

Then came the revolutionary discoveries of DDT and 2,4-D, the insecticide and the weed killer of such potency that farmers could use them to get results never before possible. If these were so good, might not other chemicals be equally good for other farm tasks? Research was greatly stimulated. Production became more efficient and product purity was increased. Labels became much more important as ways of carrying necessary information. Farmers began to change their ways of farming to use chemicals to still better advantage.

Most readers of this editorial know the story from there to the present date. Agricultural chemical research and development have become full-grown parts of our business. A relatively steady flow of new and better products, many of them highly specialized, has developed, and we are now inclined to take it for granted. Sales figures annually set new high levels. Agriculture generally has come to accept chemicals as highly effective tools which the best farmers use.

Under the recent amendment of the Food, Drug, and Cosmetic Act, commonly called the Miller Bill, official recognition has been given to the practice of protecting users of agricultural products. Industry had long followed practices much like those now required by law, and good farmers have long observed the limitations that are now mandatory. Adoption of the law has shed a great deal of light upon this situation, and the industry is in a stronger position for it. We have achieved that stronger position only at considerable cost, but it is well worth the cost.

(*Continued on Page* 138)

Congress Approves Program for HYACINTH EXTERMINATION

THE scourage of the Southern States' waterways is in for a new and concentrated attack!

Two separate bills, introduced in the House of Representatives, passed by the Senate, and sent to President Eisenhower for signature, will launch a full-scale campaign to try to eliminate the beautiful, but highly destructive water hyacinth from Southern inland waterways. Southern States' spokesmen have long complained that this water lilly-like plant is seriously impeding shipping, killing off fish and other wildlife, polluting drinking water, and ruining crops.

The major one of the two bills is H.R. 8999, introduced by Congressman T. Ashton Thompson (D., La.) and referred to the Committee on Public Works. It was included in the Public Works omnibus authorization bill (H.R. 12080), and authorizes "a comprehensive project to provide for control and progressive eradication of the water hyacinth, alligator weed, and other obnoxious aquatic plant growths from the navigable waters, tributary streams, connecting channels, and other allied waters in the States of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas." The bill authorizes an expenditure of $1,350,000 annually for five years, to be administered by the Chief of Engineers of the Army.

The second bill, H.R. 11636, introduced by Rep. Edwin Willis (D., La.) amended the criminal code to make it illegal for the water hyacinth and two other aquatic plants to move in interstate commerce. It is intended to reduce the possibilities that the plants might be spread to other states and localities not yet plagued by the menace. Two bills similar to those passed, Senate Bill 3392 and H.R. 11517, died in Senate and House committees.

The Federal Congress is not alone in recognizing the dangers of the plant's spread. The United States Department of Agriculture, the Army Corps of Engineers, state governments, and even private agencies have been studying the problem since the 1930's. This year, additional funds have been appropriated for expanding research in aquatic weed control by the USDA. New research programs are being initiated in aquatic weed control in Louisiana, Arkansas, and Florida, with the water hyacinth to be given prime attention.

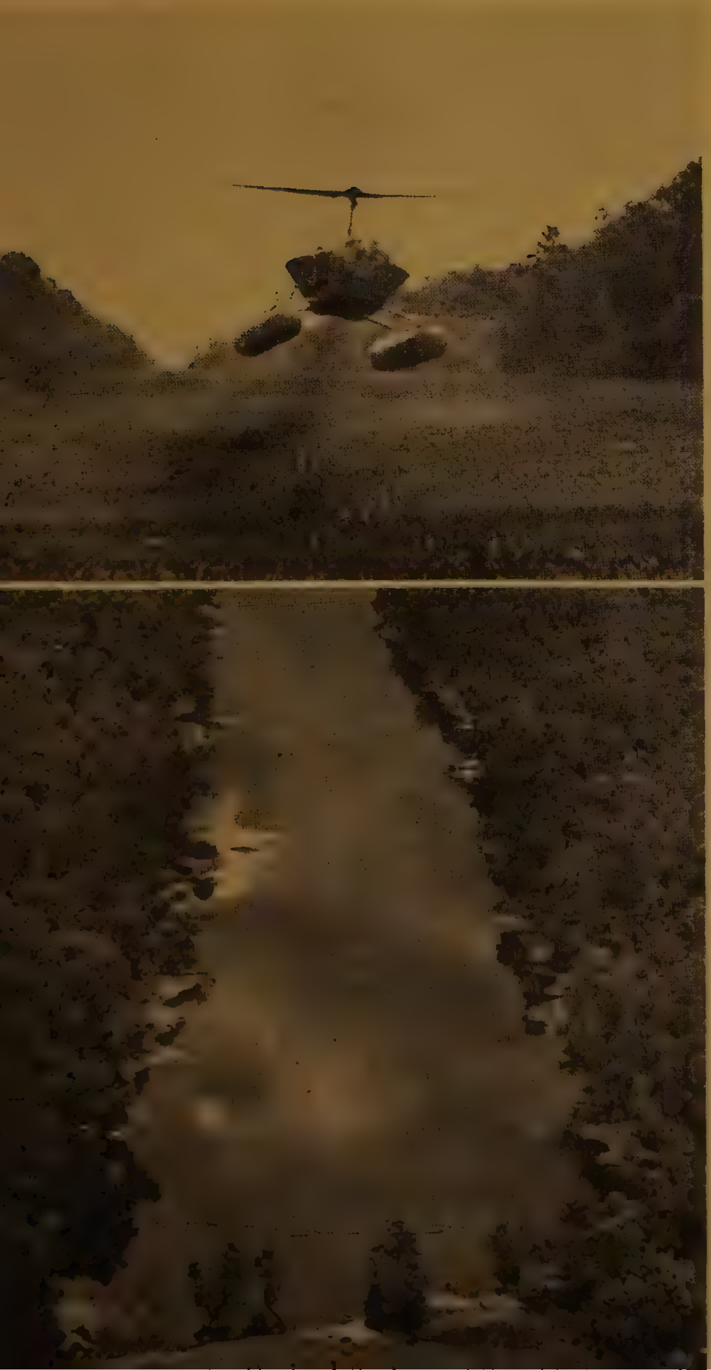
The water hyacinth (*Eichhornia crassipes* Solms.), ironically enough, is one of the prettier of the aquatic plants in the South, producing luxurious green leaves and colorful purple flowers. However, any esthetic opposition to its destruction usually fades before figures estimating tremendous economic losses directly attributable to the plant. In Louisiana alone, losses are estimated to reach $35 million a year in damage to canals, lakes, shipping lanes, etc. The losses to the state's wildlife resources are inestimable.

The main problem with this plant stems from its toughness and fantastic reproductive powers. In some areas it chokes once swift moving water with a thick matting able to support the weight of a man. If left undisturbed, experts estimate, water hyacinth colonies would double in size every month from May to September. These awesome abilities, let loose in the normally warm and usually sluggish streams of the South, have combined to impair seriously much of the South's important water commerce. Skippers of tugs, and of the thousands of barges and smaller commercial and pleasure craft that navigate the inland waterways, have constantly to revise their charts and routes as the open water is cut down by the hyacinth invasion.

Conservationists haven't begun to estimate its long-range effect on the region's wildlife. Fish die for lack of the oxygen on which the plants gorge themselves. Ducks and other migratory water birds seeking open water find their customary stop-over lakes and swamps choked and matted; and muskrats, racoons, and other small animals living near the water have to scramble to locate once-abundant open water. Only mosquitos and other obnoxious water-bred insects find prolific breeding opportunities in the slower water circulation. Pollution, too, increases as loss of the water's oxygen prevents normal oxidation of waste materials, and extensive matting reduces aeration.

Agriculture hasn't been spared a liberal share of water hyacinth losses. The scourge chokes up drainage ditches and irrigation canals, in some cases damaging the walls or causing overflow damage to bordering fields. By their very bulk and toughness, the plants cause flooding of slow moving streams by damming the flow of the water under bridges and in narrow places. Here too, geologists haven't begun to estimate what the long term effect might be on future water levels in the recently clogged waterways, but scattered flooding is seen as a distinct possibility.

Photo, Facing Page:
For breaking severe jams of water hyacinth vegetation and where immediate passage through an infested stream is required, the Corps of Engineers employs a large mechanical destroyer mounting a "lawnmower" device.



Water hyacinths in the pit (upper photo) were sprayed with 40% 2,4-D from a helicopter on July 19. Seven weeks later another photograph revealed that 90% of the area had been cleared, with only fringe plants and a few dead ones remaining. Experiments were conducted during 1949 on the Bonnet Carre Spillway, Louisiana. **Photographs-Boyce Thompson Institute for Plant Research, Inc.**

Though it has been a serious pest in the South for more than 50 years (and in Ceylon, Pakistan, and other Eastern countries as well) the water hyacinth came to this country almost by invitation. It was a feature of the Venezuelan exhibit at the New Orleans Cotton Exhibition in 1884, and its beauty attracted so much favorable attention that it was intentionally carried to home ponds and pools throughout Louisiana and neighboring states. It thrived tremendously on Dixie water, and is now found in North Carolina, South Carolina, Georgia, and in all of the Gulf states. One of its bad features is, that, except for its beauty, it is economically good for nothing. The plants contain 95% water and only minute amounts of now commercially-extractable mineral matter.

Federal and state government agencies, and experimental station and private researchers, have been experimenting for years to find a suitable method of eradication, ranging from fantastic-looking machines to various kinds of chemical herbicides. The Corps of Engineers has employed water-going "lawnmowers"—shallow-draft boats equipped with a flailing chopper device—and have enjoyed at least temporary success with them. But, at best, this is only a temporary solution, for within weeks the reproductive hyacinth has reclogged the mowed area, and the job has to be done again.

The obvious solution was some form of chemical spray, which would kill or damage the plant without harm to animals, crops, humans. First at-attempts were made with an arsenic spray boat, but it was quickly discovered that the spray was perhaps more deadly to cattle, other plants and to humans than it was to the water hyacinth. In 1948 a joint research project was carried out by members of the staffs of the Boyce Thompson Institute for Plant Research, Yonkers, N. Y.; Tulane University, New Orleans; and the U. S.

Corps of Engineers, New Orleans District.* It revealed that of all chemicals then used as herbicides, 2,4-D (2,4-dichloro phenoxyacetic acid) was, by far the most effective.

Not only does 2,4-D kill the water hyacinth, but drags it to the bottom of the water. Also, it has proved fairly effective in dealing with the alligator weed, a land-anchored water plant which often occurs either with, or on top of, the water hyacinth. The 1948 tests, moreover, showed 2,4-D to give no evidence of toxicity to livestock, fish, or other wildlife, even though they ate the foliage of the treated hyacinth or drank the sprayed water. Other weed killers tested killed varying portions of the wildlife, with one of them, 10% sodium pentachlorphenate, killing nearly all the fish in a test pond.

As with every weed killer, 2,4-D varies in effectiveness with time of application, age and growth density of the plants, and with various other related factors. In all cases in the 1948 tests, however, an "effective treatment" was considered one which killed all the hyacinths and caused them to sink within 60 days after the application of the spray. It was found that the alkanolamine and triethanolamine salts of 2,4-D were of equal activity and as dependable for achieving "effective treatment" as were the isopropyl and butyl esters of the herbicide.

As to amounts required for effective eradication, Zimmerman *et al.* write "Increasing the dose of 2,4-D from four to 16 pounds per acre caused an increase in the number of plants which sank in a given time. When 2,4-D was applied at concentrations of 0.5 to 8.0 per cent and at delivery rates of 18 to 200 gallons per acre, a dose of eight pounds per acre caused hyacinths to sink within 60 days at all times of the year. Regardless of the quantity of spray solution applied, 0.3 per cent 2, 4-D was the approximate minimum concentration found to be effective. Applying more than 75 gallons per acre with low pressure equipment or more than 200 gallons per acre with high pressure equipment caused no noticeable increase in killing or sinking of the plants.**

Two of the boat-spray methods of eradication which will be used by the Corps of Engineers. In the upper photo a small patrol maintenance boat is operating in a shallow, narrow stream. Below, a larger spray pontoon is shown operating its elevated spray gun designed for reaching over fringe growths to treat adjacent feeder areas. Of the two, only the patrol boat is self-propelled.

Since most of the water hyacinth's remarkable growth and reproduction is accomplished in the spring and early summer, the time of treatment with 2,4-D is of considerable importance. Hitchcock *et al.* point out: "Three hyacinths placed in a pit on May 11 produced approximately 30000 new plants in 50 days and about 7500 at the end of three months (August 15). This is to be contrasted with the production of 32 new plants in 50 days from three hyacinths placed in a pit on August 23. About August 15 the older extensively developed roots up to two and one-half feet long began to die on plants growing under natural conditions. By October 1 the root systems of most plants were greatly reduced in size and poor in appearance. It was estimated that the rate of growth of hyacinths and their vegetative reproduction were reduced to at least 20 per cent after August 15. Consequently, many of the treatments applied during June and July which resulted in less than 100 per cent killing appeared less effective than they actually were due to the relatively rapid rate of growth and production of offshoots in the plants which were not killed."***

The Boyce Thompson researchers conclude, from this last observation, that most favorable results with 2,4-D sprays may be obtained in a period from approximately August 15 to mid-March, a period when the plants will be unable to make up for losses by rapid regrowth and reproduction. They advise at least one complete spraying during this non-growth period, and another during the period of most prolific growth in spring and early summer. This will

(*Continued on Page* 137)

---

* Results of the tests are published in three technical articles by P. W. Zimmerman, A. E. Hitchcock, Henry Kirkpatrick, Jr., and T. T. Earle, all of the Boyce Thompson Institute for Plant Research, Inc. The three are titled: *Water Hyacinth; Its Growth, Reproduction, and Practical Control by 2-4-D* (April-June, 1949), *Control of Water Hyacinth* (Jan. 1950), and *Growth and Reproduction of Water Hyacinth and Alligator Weed and Their Control by Means of 2-4-D* (April, June, Aug.).

** *Control of Water Hyacinth*, Zimmerman et al.

****Water Hyacinth; Its Control by 2-4-D*, Hitchcock et al.

SALES?
STOCKS
PROFITS?

The 1956 Pesticide Season in Review

C. M. Meadows
Southwest Sprayer & Chemical Co.
Waco, Texas

THE greatest potential sales prospect, the introduction of a new systemic insecticide, an invasion of cabbage loopers, continued destruction of the spotted alfalfa aphid, the collapse of sales due to the drought and the promise of a new effective dessicant for cotton kept the Southwest on its toes this season.

Insects (boll weevils) going into hibernation in 1955 were the greatest in history and as we had little or no winter for 1955-56, it was natural to expect super 1956 sales. The season started off well, with early season insecticide sales excellent; however, as June and July rains failed to come, weevils were reduced to scattered infestations. Bollworms were destructive on irrigated cotton, but of little importance elsewhere. The cabbage looper appeared as a destructive insect of economic importance on cotton for the first time in this area. Cotton which had been treated previously with Toxaphene-DDT or Endrin did not develop damaging infestations of loopers, but cotton that had been treated with other insecticides did. It was difficult to control established infestations with any of our present chemicals.

Thimet, a new systemic insecticide produced by American Cyanamid Co., was introduced in Central Texas on a commercial basis for the first time in 1956. Approximately 250,000 pounds of cotton seed or enough seed for 10,000 acres was treated. Sales were made to the more progressive farmers and as many observations and records made as possible. From early reports, it would seem that 75% of the growers were satisfied with the results, for a high percentage say they will use the product in 1957. Systemics definitely have a place in cotton insect control, and will be widely used within the next few years.

Mid and late season sales, with the exception of irrigated areas, were small. However, formulators are beginning to adopt a wait and see attitude before stockpiling large amounts of insecticides, and field inventories are not excessive.

Prices were fairly uniform in Central Texas in 1956. It has been the opinion of the writer that there are no secrets in this business. I am not so sure about that now as I find that production cost of some of my neighbors goes below and beyond the cost of the raw materials.

Some 200,000 acres of cotton in Central Texas has been plowed under in the Soil Bank Program. This plowed under our defoliant sales too.

The small formulator has learned a few hard facts in the past four or five years—he has to sell a good product at a fair profit; he has to offer service as well as products; he has to advertise; and he can no longer depend on one crop to finance his business. This means he has to diversify his business, introduce new products, find new markets. If he fails to do this he will not be in business long.

Harry E. Johnson
Triangle Chemical Co.
Macon, Georgia

IT is somewhat early to give a final accounting of 1956 business in pesticides, and a number of factors could affect the year end situation. However, to date our sales are about 15% ahead of last year. We were looking for this trend to continue and it may still do so. A sharp drop in movement of insecticides took place in this area August 1st, however, which was a great disappointment to us since we had expected sales to continue in rather high volume through August and into September. We may still enjoy a considerable pickup in sales in the northern areas as migration moves northward.

There has been no noticeable resistance developing to insecticides in Georgia. As usual, a few complaints are made, but investigation will generally reveal that improper dusting procedures are responsible. In spite of this there is a tendency to increase concentration of insecticides. As a result the trend on BHC insecticides is toward 3-10 combinations with, in some cases, calls for concentrations as high as 6-10 and 6-20. We have steered away from such high concentrations inasmuch as a combination of 6-10-40 for instance, would have only 10% of clay diluent if low gamma BHC were used. There has been considerable movement of Aldrin combinations containing 5% Aldrin and some combinations of 20-10 Toxaphene-DDT.

BHC-DDT combinations still hold the lead and if anything are gaining ground in this area. This year they accounted for about 80% of sales, with Toxaphene and Aldrin following second and third. Endrin formulations have picked up somewhat, but are still a very low percentage of the total, while there is practically no demand for Dieldrin and Heptachlor dusts or sprays for cotton.

Prices have been fairly stable in this area after an initial break in early June, the only break that has occurred this year. There has been an increase in activity in warehousing deals and other undercover price cutting practices, but to date these factors have not been of serious consequence.

With reference to new insecticides, some increase in the use of systemics is noted, but this is still of minor volume. Although Dieldrin is not popular as a cotton poison, sales of Dieldrin insecticides for soil treatment and pest control are gradually increasing, while Chlordane is holding its own. These two insecticides have practically replaced Pentachlorophenol as a treatment for control of termites.

We anticipate our stock carryover to be somewhat less than 10%. All-in-all, we expect to make some profit but it certainly is not yet a bed of roses.

S. H. Bear
Niagara Chemical Div., Food
Machinery & Chem. Corp.
Middleport, N. Y.

1956 may be recorded as a year of plenty. Insects, insecticides, farm crops, automobiles and politics have been in plentiful supply. It promises to be a good year for almost everyone.

Insect infestations and disease prevalence have been about normal, with perhaps an inclination toward the high side for "bugs" and the low side for "diseases."

Public attention has been directed to a few abnormal insect problems, such as grasshoppers in certain areas, yellow clover aphids in the Southwest, Mediterranean fruit fly in Florida and boll weevils in the Mississippi Delta cotton crop.

None of these well advertised problems were of a magnitude that would affect the national economy or greatly modify our overall industry's sales. In general, insect control responded well to thorough, established practices accepted by farmers as a regular cultural operation.

Disease prevalence has been normal. Lack of fungus-stimulating moisture and a late start in the Northeast fruit belt made effective control easier for such diseases as apple scab and brown rot.

Crop conditions, while "spotty," are excellent. The November freeze in the Northwest, spring freezes in Massachusetts and the Hudson Valley, and local frosts elsewhere pruned the national apple crop to an estimated yield of 80 to 85 percent of last year's production.

The eastern peach crop was normal in size. Floods in California had only a minor effect on western production.

The cotton crop in the Southeast and Midsouth is good. Drought is curtailing yields in Texas, but drought always does reduce production in Texas in dry period cycles.

Vegetable, tobacco, corn, soybean and other grain crops are good.

Prices for farm crops harvested to date have been high. This is particularly true of crops making up the major market for agricultural pesticides. The agricultural economy with help from government price supports, soil bank and high level of prosperity in the consuming public appears to be improving over 1955 conditions.

A continuing active demand for pesticides is assured even though much political publicity is given to the sad financial plight of farmers. This comment recalls a recent discussion with a plantation owner on the ailments of agriculture. When asked why he did not sell out and quit, he replied after a long pause, "I would if things were not the way they are."

The pesticide industry will enjoy a record sales volume in 1956. Supplies are in very good balance with demand. Capacity production by the industry was not needed to serve the market. Production control to fit the demand has been well exercised. Inventories, with the expected normal demand to the year end, should not be burdensome.

Profits to the industry, except on some specialty items, are generally unsatisfactory. No doubt some producers would quit "if things were not the way they are."

J. M. Taylor
Taylor Chemical Co.
Aberdeen, N. C.

THE pesticide season in the southeastern states shows considerable improvement over the 1955 season. Dry weather in some areas, however, made the season shorter than expected from the insect counts made earlier. Demand was very irregular. Where there was enough moisture, business was good. When it was hot and dry, demand was light.

There seems to be more interest in the newer pesticides, particularly the phosphates and systemics. Some cotton growers continue to talk about resistance to the chlorinated hydrocarbons by the boll weevil. The next year or two should tell if we're going to change to other pesticides.

We believe our industry needs two major projects if we are to continue to serve our customers and take the risks involved. The first is a better industrywide marketing policy. The second is a cooperative effort toward educating users of pesticides so they can get maximum benefits from our products.

O. C. Behse
Agricultural Chemicals, Inc.
Llano, Texas

OUR analysis to date, August 13th, of the domestic insecticide season is limited to our operations in the Mid South and the Southwest cotton belt, and represents thumb-nail opinions of our 8 plant managers.

The pre-season and early season optimism gradually dissipated, as lack of moisture reduced both plant growth and infestations. Currently, less than 10% of Texas non-irrigated cotton requires insecticidal treatment and at least 70% of the Mid-South is "cutting out" due to droughts. As a natural result, there will probably be another considerable carry-over of finished and semi-finished pesticides.

We consider severe insect resistance to several chlorinated hydrocarbons to be an established fact. Boll weevils are the worst offenders, with a resultant large consumption increase of calcium arsenate and organic phosphorus compounds.

Two insects are increasing in economic importance, namely, the alfalfa aphid and the cabbage looper on cotton. Both are very difficult to control and materially increase cost of production.

Prices on basic materials remained quite firm, but formulated material prices showed some improvement over last year in some sections, but declined in others. On an average we see little, if any, improvement.

We are of the opinion that due to reduced acreages, a low farm economy, poor cost accounting systems, wishful thinking on anticipated demand, unnecessary competition, unjustified credit terms, consignment deals, etc., the pesticide industry is still sick in our territory. Strong medicine in the form of policy corrections will be necessary for convalescence.

Alfred G. Raufer
Michigan Chemical Corp.
St. Louis, Mich.

DOMESTICALLY this year has been very good for DDT sales. Rainfall has been at least adequate in most areas and in some places above normal. Crop prospects, accordingly, have been encouraging to growers, resulting in greater interest in and use by them of insecticides and fungicides. The insects, too, have cooperated by appearing in normal to above normal infestations in the fields and crops.

In particular the cotton area has been generally cooler. This condition, plus rains when higher temperatures might have resulted in reducing boll weevil infestation, retained the threat of continued insect damage and kept spraying and dusting in the picture.

Corn borer populations remained high and, with the comparatively newly introduced granular DDT, there has been more activity on corn borer control in 1955 than for several years past. It is because of the development of such new formulations and methods of application that insect control has remained at such a high level.

Other insect control programs have also contributed to domestic consumption of DDT. In forest insects, for example, the fight against the Gypsy Moth and the Tussock Moth in particular have been increased. Crop prospects for field crops other than corn and cotton have also been good, with resulting increase in interest in insect control.

Another factor contributing to this year's movement of DDT has been the continued interest in the World Health Program. Shipments, for example, of 75% Wettable DDT for mosquito control have been made to many of the free countries of the world. All of these uses of DDT, together, have contributed to a very good season up to now.

At the time of this writing, Aug. 9, prospects for insecticide consumption the remainder of the year appear to be fair. Domestic consumption of DDT appears to be tapering off, although cool weather in some of the cotton areas could mean one or more additional applications of insecticides. It is not anticipated that continued insecticide applications will do much more than reduce finished goods stocks, with an occasional purchase of technical goods to finish out the season.

W. R. Peele
W. R. Peele Company
Raleigh, N. C.

ALTHOUGH my company has enjoyed an appreciable increase in business in 1956 over every previous year of operation, I can't help but voice a note of caution to our industry, with the hope that all of us will think seriously toward strengthening our position to face definite indications of changing economics in the years ahead.

Insecticide and chemical use by farmers in 1956 has been distributed more evenly throughout the growing season than in most past years. Our area has been almost completely devoid of sudden and severe fluctuations and serious outbreaks of insects. Expected sudden serious infestations, even in localized areas, have failed to appear. Instead, the demand for insecticides and chemicals has been rather constant and even running. Volume-wise, I would say, demand has not been as great as in some previous years.

Two reasons for this more or less restrained demand have been, first, less than anticipated general insect infestation and second, definitely restricted credit availability from local sources of credit to farmers. A third reason, too, may be contributory. This is the practice, of unprecedented proportions this season, of organizations within the industry using price-cutting tactics as a sole means of obtaining new business. This practice has caused such wide divergences of prices that dealer and farmers alike have become highly skeptical of prices they pay, wondering if at any price they may be paying too much.

This factor, in my opinion, has caused many dealers and farmers to be very reluctant to buy. You may argue that a farmer must buy insecticides and chemicals if he has need for them. That is partly true, but the doubts that have arisen in their minds have definitely caused them to be much more cautious in buying and using these materials.

Tobacco hornworms, although anticipated at beginning of the season to be a major threat, have never developed into any real serious threat. Instead, budworms, have probably been the most serious and difficult insect to combat this year in our area. TDE, parathion and endrin have been used more for combatting the budworm than the hornworm. Endrin has enjoyed an appreciable increase in popularity and effectiveness in 1956. MH-30 "maleic hydrazide" for sucker growth control, has been a very popular chemical in sales volume-wise.

Demand for coton insecticides in this area has been limited. In the tobacco area, because of press of tobacco growing and harvesting, cotton tends to be neglected insofar as insect control is concerned. The cotton crop, in our sales territory embracing three or four states, has enjoyed a normal growing season, without any widespread serious outbreak of insect or disease threat. From a growth and development standpoint the prospects for a good cotton yield are most encouraging, provided the intensified threats by bollworm and boll weevil during this migration period are recognized and the necessary control measures taken. In other words, cotton yields can still be seriously jeopardized, but there is still time to combat these threats. This opinion is based not only upon our close appraisal of situations within our own sales territory, but more upon a serious study of cotton production across the entire Cotton Belt. Stocks of insecticides are at a minimum in the southeast, and we should not have a large carryover this season.

John Stoddard
Prentiss Drug & Chemical Co.
New York, N. Y.

In the eastern United States 1956 has been "a big year for bugs," and consequently an excellent year for pesticide sales. Last winter's optimism was apparently justified.

Prices were very weak at the beginning of the season, however continued strong demand for large tonnages of BHC and DDT, as well as other cotton insecticides, soon stabilized prices at a higher level than this pesticide industry has enjoyed for a number of years. We have, of course, had our usual retarding conditions, such as a late freeze and some drought, but to use an apparent contradiction these are the variables that are constant in this particular industry.

The effect of the Miller Amendment has been felt for the first time, and this new law is beginning to have a stabilizing influence on the industry.

1. Because we are no longer fighting time and infestations, we are beginning to reap the benefits of advance sales, for the farmer can no longer afford to gamble with the possibility of higher residues.

2. Because it has substantially reduced the number of new materials introduced this year, thus eliminating some of the usual confusion in the minds of formulators and farmers about what material to buy for any particular use.

Also, as a result of the Miller Amendment a number of other chemicals, especially those exempted from tolerance restrictions, are beginning to find wider use. Pyrethrum and Piperonyl Butoxide for use as a grain protectant after harvest, is a primary example of such a new market. In the agricultural field Rotenone and Pyrethrum and their various combinations have increased in tonnage use as a late season application for truck crops.

Based on trends that have become apparent this year, 1957 should prove to be another excellent year for the sale of pesticides.

Albert Fuchs
Atlas Agricultural Chemicals, Inc.
Waynesboro, Ga.

A new deal for our industry began at the end of World War II. We developed a whole series of new chemicals which were the product of extensive and intensive research. Our rebirth was accompanied by painful problems of production, distribution, recommendations, and acceptance. In the earlier years, production costs were relatively high, but as demand increased and production facilities were expanded, costs dropped. With many companies entering this expanding market, overproduction resulted, bringing with it the problems of severe competition, lower prices and diminishing profits. This situation has continued to evolve throughout the last decade.

One of the most important markets has been the "Cotton South" as many of the new pesticides were ideally suited for insect control on this staple southern crop. Too many manufacturers viewed this great market as their "happy hunting grounds" — an exceptional opportunity to expand sales. However they overestimated the market and underestimated the competitive spirit.

Unbusinesslike practices developed, until finally terms of sale came to be set by the consumer rather than by actual costs. Seasons of heavy and

(*Continued on Page* 128)

Comments from the following representatives of industry appear on pages 128, 129, 130, and 133

P. S. Catir, Eastern States Farmers' Exchange, West Springfield, Massachusetts
Melvin E. Clark, Frontier Chemical Co., Wichita, Kans.
J. F. Hanley, Coop. Seed & Farm Supply Service, Richmond, Va.
George E. Simches, Planters Chemical Corp., Norfolk, Va.
P. J. Reno, Hercules Powder Co., Wilmington, Del.

Equilibrium of Retention of Phosphates in the Soil and maintenance of its phosphoric potential

By G. Barbier
and J. Chabannes

HERE'S a fundamental question which has not yet clearly been answered: take a soil which has received a certain quantity of P_2O_5 in the form of soluble phosphates and which subsequently yields the same quantity of P_2O_5 to crops—does it finally return to its initial status of P_2O_5? In other words, when the store of total P_2O_5 of a cultivated soil is maintained constant, by applications of soluble phosphates, the other conditions being kept constant, is its feeding power susceptible to change?

It is recognized that the assimilability of P_2O_5 by a soil would tend to diminish if such conditions did not exist, and even that the decrease would proceed rapidly. It would be necessary in order to maintain yields, to accumulate phosphates indefinitely in a soil through furnishing it always more P_2O_5 than is removed by crops (1.)** The limit of possible utilization of phosphatic fertilizers by an indefinite series of croppings at a maintained productivity level would be much lower than 100%. If this limit were for example 50%, it would be necessary to furnish indefinitely twice as much phosphorus as removed by crops in order to maintain the productivity level.

If contrarily, no change occurred in the value of the soil's phosphate content after the crops have removed a quantity of P_2O_5 equal to that applied, everything would be as if the phosphate had been utilized 100%, the soil's reserve not having become involved at all, and there would be no need to enrich the soil to maintain the fertility at its actual level.

Research using P^{32} appeared at first to confirm the first of the two answers above. In effect, the first crop's utilization of P_2O_5 in a field which has had a phosphate dressing has been found generally to be much below 50%; knowing by other means that the after effects are small and rapidly diminishing, the limit of the sum of the successive utilizations would remain very far from a toal utilization. However, later results obtained by means of P^{32} strongly suggest a reconsideration of the first interpretations: it seems that the plant might be able to yield to the soil P_2O_5 from the fertilizer previously consumed, while at the same time continuing to accumulate P_2O_5. The fact that the quantity of fertilizer phosphorus in the crop rises to a maximum during the vegetative period only to diminish later, perhaps by as much as 2/3, (2) is particularly suggestive in this regard. Now, this exchange back and forth of phosphate between plant and soil can be a continuous phenomenon, so that the plant might have been able to yield to the soil P from the fertilizer before the maximum could have been reached and continued to absorb it afterwards. In these conditions, the quantity of tagged P contained in the crop at a given moment would be lower—even at the time of the maximum and *a fortiori*, later—than the amount of P_2O_5 of the fertilizer consumed by the plant since the begining of its growth.

If the stock of P_2O_5 of the soil is maintained constant, its feeding power can not diminish indefinitely and tend toward zero. But it could diminish up to a level relatively low and incompatible with a good level of fertility.

We shall now consider successively the two large groups of phosphatic mineral compounds of the soil:

Here is an interesting and worthwhile contribution by two eminent research workers in France on the behavior of nutrient phosphorus in soils. The authors pose this question: if the stock of P_2O_5 of a soil is maintained constant by means of applications of soluble phosphates to compensate losses, will its nutritional potency remain constant? How this question is resolved shows ingenuity and research skill. Because of the general interest in the United States on this subject provoked by current conflicting interpretations of soil phosphorus activities, this article is recommended to both laymen and professionals in our industry.

V. Sauchelli, translator

---

*National Agronomic Research Institute, Versailles, France.

**Numerals in parenthess refer to literature references listed at end of article.

(a) the phosphates having a definite composition, essentially calcium phosphates; and (b) the compounds formed by absorption, formed by the clays or the gels of sesquioxides, or even with the calcium carbonates (3).

I. Calcic Phosphates

IN the present state of our knowledge of calcium phosphates, it is conceivable that the formation of these phosphates results in a lowering of the efficacy of the P_2O_5 reserves (supposedly constant), because the precipitation of the calcium phosphates is but imperfectly reversible: each kind of calcium phosphate (except monocalcium phosphate) when coming in contact with a phosphatic solution held at a concentration slightly below its solubility, is subject to a partial dissolution, because it would transform itself into a new type richer in calcium and much less soluble, and thus as a consequence until it becomes an apatitic form of phosphate.

Let us picture a soil whose most soluble phosphates (calcium phosphate and absorption compounds in mutual equilibrium) have a solubility much higher than that of the apatitic phosphate. Let us suppose that by applying a phosphatic fertilizer, there results a calcic phosphate having a solubility sI sO. That phosphate could yield only a part of its P_2O_5 below the concentrations comprised between sI and sO. Consequently, the crops could not consume quantities equal to those applied, except by drawing upon first the initial stock of calcium phosphate of solubility sO, which will thin out, then on the initial stock of absorbed P_2O_5. This latter will be replaced little by little by a calcic phosphate. Assuming however, that the concentration of the solution in equilibrium with the adsorbed P_2O_5 diminishes in a continuous manner relative to the quantity present, the concentration should go on decreasing up to the solubility of the apatitic phosphate. To be more definite, everything would go on as if the absorptive power of the soil should increase with each new accretion, new quantities of calcium participating in the retention of P_2O_5 in the form of calcic phosphates which would go on accumulating.

But we do not know either the fraction of the soluble phosphates incorporated which are susceptible to precipitating initially under the form of calcic phosphates, nor the fraction of these phosphates which will leave behind at least a residue of only weak solubility.

Let me give you preliminary results dealing with this latter point from some current personal researches. (5): a small quantity of a calcium phosphate was precipitated by $CaCl_2$ from a solution of ammonium phosphate containing 2 grams P_2O_5 per liter at a pH of 6.2. Next, the precipitate was subjected to successive thinnings by means of a solution of $CaSO_4$, 0.0075 M, having pH=7.25. A chart showing the amounts which went back into solution at each equilibrium comprises a series of bars of a decreasing order. The first corresponds to a solubility of 5.5 mg. P_2O_5 per liter, comprised between that of the dicalcium phosphate, hydrated, and that of octaphosphate $Ca_4H(PO_4)_3 . 3H_2O$. (6) In all, about 50% of the P_2O_5 *redissolved from the phosphate* initially precipitated went into solution again before the solubility dropped to about 1.5 mg. P_2O_5 per liter, a value which doubtless is far larger than that corresponding to the optimal nutrition of plants.

Consequently, of each addition of soluble P_2O_5 (of which only a fraction precipitates) that fraction which will form in the soil a calcic phosphate having a solubility lower than that compatible with a high fertility level can be very small indeed, at least in a non-calcareous soil.

However that may be, it is absolutely necessary to continue these chemical studies of the conditions governing the formation and re-dissolving of the different mineralogical types of calcium phosphate, if we are to increase our knowledge of what occurs in these situations.

II. Adsorbed Phosphoric Acid

THE adsorption and desorption of P_2O_5 in the soil seems to have been by now sufficiently investigated for one to be able to answer less evasively the question previously posed regarding absorbed and calcic phosphates.

a. *Influence of pH on the adsorption of phosphates.*

By agitating different kinds of calcic clays (kaolinite, montmorillonite, loam sub-soil) with a very dilute solution of calcic phosphate at variable pH's (increasing from 3.0 to 8.5) we have noticed that the quantity of P_2O_5 released by the solution increases at first rapidly up to about pH 6.0, then decreases up to pH 7.5 or even up to pH 8.0. The fact that the alkalinization of the medium by the calcium has decreased the retention of the phosphates proves that this retention is not due to the formation of calcic phosphates. On the other hand, it reveals the characteristics of a typical adsorption: in particular, the quantity of P_2O_5 remaining in solution at a constant pH increases more than proportionately to the quantity retained (7).

b. *Limited character of the adsorption of phosphates.*

The curve based on function of time and the adsorption of phosphoric acid by a neutral loam sub-soil shows a tail sharply separating two distinct branches: the adsorption is very rapid during the first minutes then moves slowly during at least 45 days. Once the final equilibrium is attained, there remains in solution a tiny fraction, never none, of the introduced phosphates. The fixation is never total (altho' it could become practically total, considering the errors that can creep in when the measurements concern soils of a high adsorptive capacity, like the laterites).

From the fact that an increase in the amount of adsorbed phosphate determines an increase of the concentration of P_2O_5 of the solution at final equilibrium, one may deduce that if the stock of adsorbed phosphate remains constant, the concentration of P_2O_5 in solution, in equilibrium with the adsorptive media, can not diminish.

c. *Reversibility of the "reversion" phosphates.*

The second phase of phosphate adsorption is followed, as is known, by a decrease in the quantity of P_2O_5 extractable by dilute acids. This phenomenon has often been considered as coming pretty close to an irreversible "fixation" of P_2O_5, called in France "retrogression."

Many facts prove that the fraction which cannot be extracted by dilute acids remains in the soil in equilibrium with the remainder that is extractable.

(1st) The fraction which remains extractable by dilute acids diminishes with time, but does not approach zero, and finally reaches a definite, fixed value. In an experimental field of the Station (Versailles), kept fallow (loam, pH = 6.0 about) this fraction decreased after a few years to about 1/3 of the amount originally incorporated as superphosphate, but did not decrease further after that. One may deduce from this that the "fixation" is limited by a reciprocal reaction.

(2nd) The fraction that has become inextractable by dilute acids can be released rapidly at least for the greater part, by very dilute alkalis (2 ^{N}/1,000).

(3rd) This same fraction can also be equally released by lime (8). By extracting the superphosphate-treated soil of our experimental field with 2 ^{N}/1,000 sulfuric acid for a very limited period and alternating this with a rest period in a neutral lime medium, we were able to recover 90% of the P_2O_5 incorporated (which had been in the soil throughout a period of 8 years). The rest periods in the neutral lime medium regenerated the fraction that is extractable by dilute acids. A third extraction by ^{N}/1000 KOH brought the total amount of recovered P_2O_5 to 96 per cent.

It is possible to conclude from what has been stated above that the total or almost total amount of P_2O_5 — adsorbed by soil clays or the sesquioxides remains susceptible to taking part in the equilibria between solvent and adsorbants. Consequently, if the stock of P_2O_5 adsorbed in a soil is kept constant, according to all probability, the concentration of P_2O_5 of the solution in equilibrium with the soil can not decrease.

Conclusions

E. M. Crowther (9) has declared that phosphate fertilizers applied at Hoosfield before 1901 continued to exert a marked influence as late as 1949, which proves that the after effect of phosphatic fertilizers is exerted over a long period of years. The annual after effects of one fertilization, we know, are quite small, generally not measurable, but they accumulate if the fertilizations are repeated. Some field tests carried out on a farm in Seine et Oise prove that phosphatic fertilizers applied before World War II in excess of the removals have shown an after effect up till this year (1952) and during the entire interval these effects have been tremendous and capable of producing very high yields. On the whole, the facts obtained in cultural practices agree with the concept that a soil first enriched with phosphates with the help of soluble phosphates benefits from this up to the point when it has lost an amount of phosphates equal to that which was incorporated; that as a consequence of this it cannot impoverish itself as to assimilable phosphates, except in the case of a deficient balance, and that as a result there is no need to enrich the soil in order to maintain its fertility.

However, it does not seem possible to affirm as a fact that the strict restitution in the form of soluble phosphates of the quantities of P_2O_5 removed by croppings, is sufficient to maintain indefinitely the phosphorus potential of a soil at a level corresponding to the optimal nutrition of plants. We do not know, actually, whether or not the calcic phosphates, which are formed, leave finally a residue having a solubility lower than the optimal concentration required.

Nonetheless, assuming that soils of high productivity or previously well fertilized have invested a substantial capital of P_2O_5, one can, by restoring it, maintain maximal yields for a very long time. The result of this is that, under such conditions the feeding power of the soil can only be diminished very slowly, and that the doses necessary to the maintenance of the fertility ought not to be much higher than those required for a quantitative maintenance, at least in the case of noncalcareous soils of the temperate zone.

References Citations

(1) Prof. Bondorff, Bull. Doc. Ass. Intern. Fabr. Superphosphates, Paris 1949, No. 6, p. 16.
(2) S. B. Hendricks et L. A. Dean, 4. Intern. Congr. SOIL Sc. Amsterdam 1950, vol. I, p. 221.
(3) Soischot, Coppenet et Hebert, Ann. Agron. No. I, 1949, p. 103.
(4) Traité de Chimie minérale de P. PASCAL, t. VI, p. 1072 et suivantes, Paris 1931.
(5) En collaboration avec Jacques Delmas.
(6) D'après H. C. Asling, Thèse de la Faculte des Sciences de l'Université de Dondres 1950.
(7) G. Barbier et J. Chabannes, Ann. Agr. 1949, p. 349.
(8) Ann. Agron. 1949, p. 374.
(9) Rothamsted Expt. Sta. 1949, p. 32.

Phosphate fertilizers applied over a period of time are found to exert an "after effect", maintaining and extending fertility of the soil

A Sprayer-System for Making

E. M. Billings, Mackwin's Iowa representative, is shown actually making the adjustment as to the correct pressure to deliver the correct amount of aldrin solution as it is synchronized with the actual flow of fertilizer going across the belt. This too is part of the temporary installation.

THE trend toward greater use of fertilizer-pesticide mixtures has been getting an increased push in recent months with development of more satisfactory methods of producing the mixtures in the exact quantities desired. Until these new developments, mixing of fertilizers and pesticides was far too much of a "hit or miss" affair to suit agricultural experts, fertilizer manufacturers, and especially the users themselves.

The Mackwin Co., of Winona, Minn., a subsidiary of McConnon & Co., has been instrumental in initiating the trend toward use of the mixtures, and last year began offering a package deal to granular fertilizer mixers who wish to include pesticides in their delivered product. The entire idea has been such a success, particularly in the Midwest, that the company has come to concentrate more and more on this phase of the industry.

Mackwin assumes responsibility for all details and arrangements for setting up the fertilizer manufacturer in the business of adding pesticide to his product, even registering the product with federal and state agencies, obtaining label approval, and relieving the manufacturer of other administrative burdens. The company treats each installation as a custom operation, furnishing drawings of plant layout, estimates of plant capacities, suggestions for production grades, and proposals for the specific type of machinery needed for the plant. A complete report of the proposed system, together with a diagram of the plant, is sent to the Mackwin plant at Winona.

The company plant staff then manufactures and sets up a temporary unit, transporting and installing the unit in the particular plant. Mackwin's technical representative, who made the original estimates, and the plant superintendent stay with the equipment until it is running correctly, and then a test run of two or three tons of fertilizer is made with the insecticide, and representative samples are taken for analysis. If the system proves applicable and the analysis satisfactory to meet previously-set requirements, the plant superintendent often returns to the fertilizer plant to assist in the permanent installation of the system.

The actual heart of the Mackwin system is a nozzle-sprayer which sprays carefully measured insecticide (usually aldrin) into the fertilizer material as it passes beneath it on a conveyor system. Connected to the sprayer system over the conveyor are long agitator arms, which constantly turn over the dry fertilizer, thus enabling the insecticide spray to be distributed evenly through the mixture. In most of the systems so far installed, there are three S-shaped agitators and three nozzles, though there may be as many as six of each.

The uniformity of the systems has enabled Mackwin to cope effectively with the problem of estimating the amount of insecticide which must be sprayed into the mixture. The conveyor system moves at a carefully calibrated speed, set to match the output of the nozzles and the action of the agitators.

The success of the mixing units has brought widespread demand. According to W. T. Lemmon, sales manager, "Virtually every fertilizer plant in the midwestern states offering a pelleted fertilizer containing an insecticide has installed spraying equipment to apply liquid insecticides to their pelleted fertilizer."

The Mackwin Co. first became interested in the idea through the experiments conducted by Dr. J. H. Lilly, of Iowa State College. In 1951 Dr. Lilly worked with certain soil insecticides by spraying them on the ground and then disking and harrowing them in. He got excellent results in controlling corn rootworm and other soil inhabiting insects.

Dr. Lilly based his studies on the concept that, even in a state as highly developed agriculturally as is Iowa, there are far too few sprayers available on the state's farms. He reasoned

F-P Mixtures

A view of the actual spraying unit in operation on the belt of the fertilizer plant, showing the agitators and the series of nozzles. This is a temporary installation of the makeshift trial unit, installed prior to putting in permanent equipment.

that the more progressive of the farmers, who normally use starter fertilizer, would be interested in applying soil insecticides. In a small cement mixer he mixed insecticide and fertilizer and applied the mixture with a regular starter fertilizer attachment.

Results of these tests were so promising that in 1952 one fertilizer manufacturer, with the advice and help of Dr. Lilly and of Shell Chemical Corp., mixed approximately four tons of Aldrin-Fertilizer Mixtures. The insecticide used in this initial run was a 25% Aldrin wettable powder of very fine particle size. A number of growers used the mixture in Iowa, and they obtained such excellent results that possibilities for this type of application were immediately realized. However, in the mixing of the fine aldrin powder, much of it was dispersed into the air throughout the plant, and because of its distinctive odor presented something of a problem.

During 1953 several fertilizer manufacturers became interested in the idea. The Mackwin Co. had watched the progress of this development from its inception, and that year offered for sale a 25% 30-60 mesh granular aldrin concentrate for the exclusive use of fertilizer manufacturers. The product was formulated in such a way that it produced no dust and thus did not permeate the air. By 1954 a substantial number of fertilizer manufacturers in Iowa, Nebraska, and a large portion of those in Illinois, southern Minnesota, northern Missouri, and eastern Kansas were offering aldrin-fertilizer mixes for control of soil insects.

The movement toward granular or pelleted fertilizer at about that time virtually made the 30-60 mesh granular aldrin obsolete, for tests revealed that due to the vast difference in the specific gravity and particle size of the insecticide and the pelleted or granular fertilizer, the granular aldrin left much to be desired. Mackwin went on a full-scale research program to study this new problem, and devised temporary equipment to apply an oil solution of aldrin to the pelleted fertilizer. It is this equipment that is now being installed in various plants through the Midwest.

Although aldrin is the prime insecticide used in the mixes, Dr. Lilly, in tests conducted in 1954, has also added dieldrin and chlordane to starter fertilizers, with good results. He advises against BHC, however, as being not completely compatible with all common fertilizer ingredients. Chlordane must be used in higher dosages to give the same kill as aldrin, but Dr. Lilly found in one season's results, that isodrin and endrin may be just as effective as any of the four tried insecticides.

In the *National Fertilizer Review* for the first quarter of last year, Dr. Lilly warns against the most common faults he discovered in the early stages of the development of fertilizer-insecticide mixing techniques. He lists these as "(1) Blending instead of thoroughly mixing the insecticide and fertilizer, resulting in lack of uniformity in the finished product, and (2) Adding the insecticide to warm, uncured fertilizer, resulting in loss of the insecticide by volatilization."

Dr. Lilly recommends the mixing method employed by the Mackwin Co., saying that "good results have been obtained with three to six nozzles with turning devices between them located just ahead of the bagging operation."

The Mackwin Co. emphasizes that it does not sell the equipment used, but instead makes efforts to advise the manufacturer by offering catalogues and other literature which enable him to select the particular equipment he needs.

Once the operation is under way, the manufacturer can make fertilizer-insecticide mixtures at will simply by turning the equipment on or off. A uniform consistent mixture is insured through continuing careful use of the measured mixing unit.★★

control program against MEDITERRANEAN

Upper Left: L. F. Steiner, USDA scientist and one of the world's top authorities on Mediterranean fruit fly control, is installing a new plastic fly trap which he designed and tested in Hawaii. such traps, baited with angelica seed oil, a fly attractant, and an insecticide are used to determine the presence of the flies. (USDA Photo)

Lower Left: The scourge of citrus and other fruit crops, the Mediterranean fruit fly, is similar in general shape to the house fly. (Photo courtesy American Cyanamid Co)

WITH the authorization by Congress last month of $2,500,000 for United States Department of Agriculture pest control work (mainly to buy pesticides) the campaign against the Mediterranean fruit fly has gone into full swing. Last month Pinellas County, including the heavily-populated St. Petersburg area, was added to the six counties already covered by Federal regulation; and the population over much of Southern and Central Florida has grown used to the constant flights of spray planes.

Thus far, the Mediterranean fruit fly has been found in 22 counties of Florida: Dade, Broward, Palm Beach, Hendry, Collier, Sarasota, Highlands, Lee, Polk, Hardee, DeSoto, Charlotte, Manatee, Brevard, Indian River, Martin, Pinellas, Hillsborough, Monroe, Okeechobee, Lake, and St. Lucie. In addition to Pinellas, the five other counties covered by the Federal regulation of July 13 include Broward, Collier, Dade, Hendry, Lee, and Palm Beach. In addition to the resort areas. the total counties affected include many of the prime citrus-growing areas in Florida.

Prior to the new expenditure, a contract totaling over $500,000 was awarded to the United-Heckathorn Co. to spray 180,000 acres of Florida's coast with baited Malathion. Spraying operations by Skyspray, an aerial spraying company owned by United-Heckathorn, have been going on since late June. The company has been using four multi-engined aircraft, a B-17, a B-18, and two C-82 Flying Boxcars, spraying the area at 10-day intervals.

The USDA and the Florida State Plant Board are keeping careful check of the fruit fly's spread, mainly through analysis of insect trap catches and grower reports of fruit damage. Quarantine roadblocks have been accepted by Florida residents and tourists as a necessity, and have been successful in helping contain the insect's area of activity.

The Mediterranean fruit fly was re-discovered in north-east Miami on April 22 of this year, after having been totally eradicated in a long and costly campaign in 1929. In that last campaign $7½ million were expended, an embargo on all fruit shipments had to be put in effect, and 18 months of extensive work by the USDA and Florida fruit growers was required to exterminate the insect. Troops even had to be called out to maintain order at the quarantine roadblocks.

In appearance the Mediterranean fruit fly resembles the house fly, though in color it is somewhat different. Its back is covered with glistening black spots, with yellow and black markings on its wings. It has two white bands on a yellowish abdomen.

The femal of the species drills minute holes in the skins of fruits, laying one to ten eggs in each hole. Larvae hatch from the eggs and bur-

(Continued on Page 135)

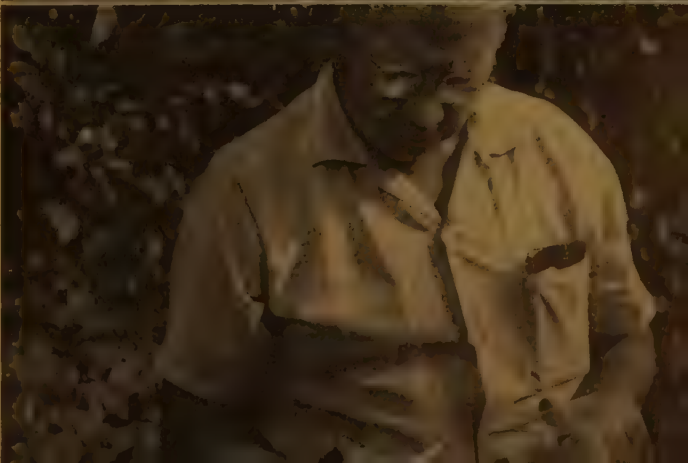
FRUIT FLY
in full swing

(A) Jeep-mounted turbine sprays are used to spray roadside areas. The sprays deliver an intense spray of malathion, plus a fly attractant, some 60 feet on each side of highways leading in and out of the infested area. (USDA photo)

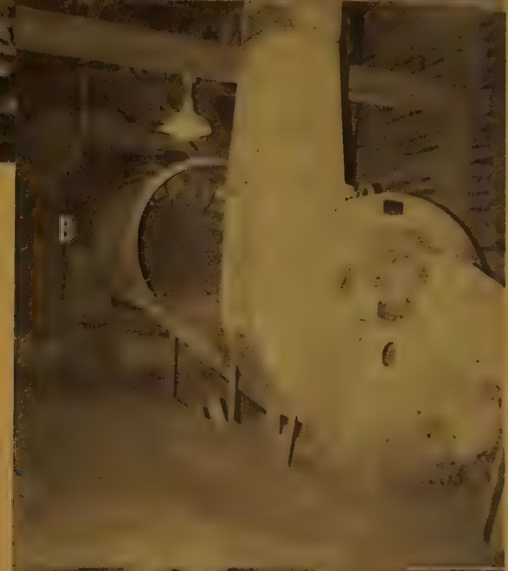
STOP
FRUIT BOUGHT BEYOND THIS POINT MAY BE TAKEN OUT OF THE STATE
FLORIDA STATE PLANT BOARD
AS 67

(B) Inspection at one of the many quarantine stations in southern Florida to prevent the carrying of the Mediterranean fruit fly out of recognized danger areas. Inspectors of the Florida State Plant Board stop all cars and trucks and confiscate host plants, fruits and vegetables. (USDA Photo)

(C) In the main eradication area of the fruit fly program in Florida, multi-engined airplanes are spraying some 210,000 acres of land, including cities, farms, orchards, and highways. Mixing the insecticide and the attractant (a yeast protein preparation) is done just before loading, as shown at the right. The big planes carry about 1,000 gallons on each trip. Note spray boom under the wing of the plane in the foreground. (Photo USDA)



(D) Close-up of new, plastic Medfly trap, used to determine the presence of the Medfly in a particular area. They are baited with a cotton dental plug saturated with angelica seed oil, and the insecticide DDVP which forms a lethal gas in the trap. In this photo, the top of the trap has been removed. (Photo USDA)



Automatic Control of Feed Rates at New Wisconsin Fertilizer Plant

EQUIPMENT installed by the Fertilizer Engineering & Equipment Company, Inc., at the Wisconsin Farmco Plant in Green Bay, automatically controls the feed rates of dry and liquid material used in production of granular, as well as normal grades of fertilizer. The continuous ammononiation - granulation unit and sizing system, as well as the feed control equipment, was furnished by Feeco.

In combination with continuous granulation, the regulation of dry material and liquids results in very accurate feed rates, and allows production to within close limits of the formula. Instead of over-formulation to meet minimum analysis, the automatic feature adjusts to closer tolerances, and will result in lowered production costs and more exacting quality control. In addition, the totalized indication of solution flow permits accurate inventory control, when compared with actual shipments of incoming raw materials.

Dry solid materials are introduced into a surge hopper after they have been blended and pre-mixed. From the surge hopper they are fed onto a vibrating feeder, and then to a continuous-weight belt.

When the material on the weighbelt is less than that required to maintain the desired rate, an automatic signal causes the vibrator to feed at a greater rate. By instantaneous and continuous signals, the dry material is measured to within 2% accuracy. With production of thousands of tons of fertilizer annually, this degree of accuracy will result in sizeable savings of raw materials.

Separate solution lines, meters, recorders and controllers are installed for 60-66° Be' sulfuric acid, anhydrous ammonia, ammoniating solutions and water.

The *anhydrous ammonia* flow metering device is totally enclosed to avoid the danger of breakage. In order to insure a positive and nearly constant head for accurate metering,

(A) Heavy duty gravimetric feeder, feeding material to TVA continuous ammoniator.

(B) Cooler and heavy duty fan, drawing about 10,000 CFM air.

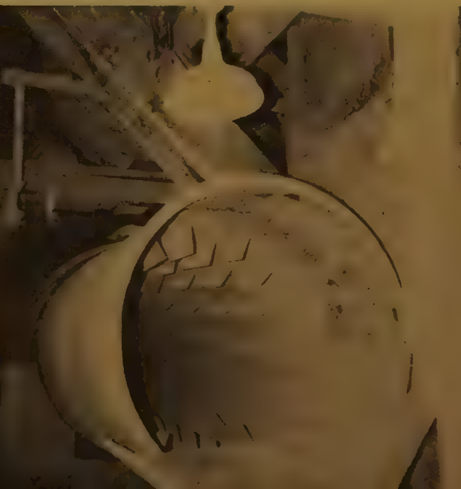
(C) Heavy duty vibrator feeding gravimetric weigh belt. Safety chain is seen in this illustration.

(D) Overall view of drier, ring gear, fume hood, operator's platform, and control panels.

(E) Cooler drum showing fluting arrangement.

(F) Double deck screen sizing granular product to 4 and 16 mesh.

(G) Fischer-Porter cabinet, showing flowrater, and magnabond instrument, and the Fischer control valve.



a positive displacement pump is used together with a bypass back to storage.

Acid is available to take up excess free ammonia and for the formation of ammonium sulfates. When reacting with ammonia solutions or anhydrous, large amounts of excess heat are made available, and this is desirable from the standpoint of driving off excess moisture and breaking down ammonium nitrates to make the mix more plastic, thereby promoting granulation. The acid, ammonia solution, and water meters have glass metering tubes for sight-flow comparisons with the recorder.

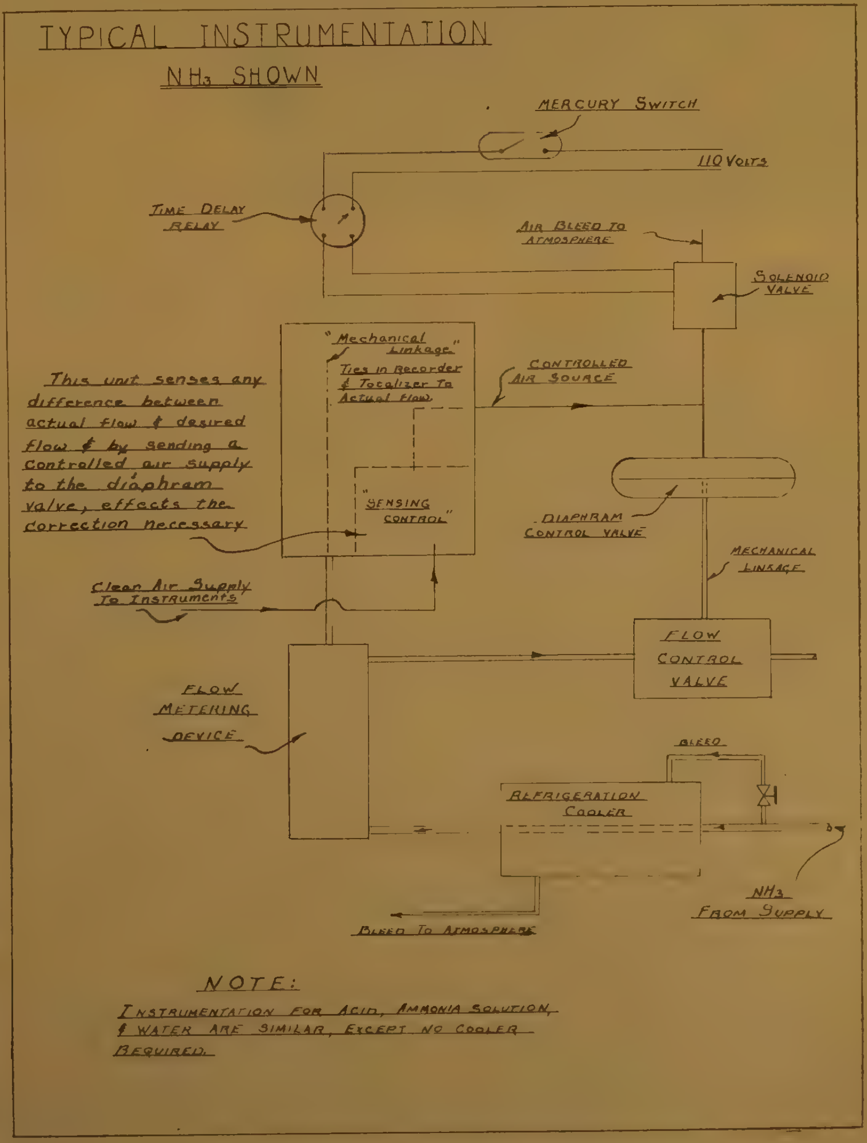
All meters are equipped with controlling valves that automatically compensate for any difference between the desired flow, and actual amount of liquid being introduced. Once the correct amount is established by formulation, the instruments are adjusted to this desired quantity, and this flow continues until changed.

Variable solution control is accomplished by using a pneumatic control valve. When 3 psi air is supplied to the top of the diaphram, the valve opens. At 15 psi the valve is fully open, and any intermediate rate requires proportionate amounts of air. In the event that the dry materials flow stops, it is desirable to stop flow of liquids to prevent excess fumes, possible corrosion, waste, and over-liquification of the material in the ammoniator. Solution is stopped as follows: When dry material flow stops, a mercury (or micro switch) is activated. A completed circuit starts a time delay switch, and after a given time (set as desired) a secondary 110 volt circuit is completed. A solenoid connected to the top of the diaphram control valve is wired into this secondary circuit. When the solenoid is activated, the air on top of the diaphram is exhausted and the control valve closes.

Another feature of the system is that control can be set to give the desired process response. The sensitivity and time it takes to adjust to a change in the system are set manually, and are determined by maximum allowable tolerance of error in the system.

An *ammonia solution* metering device is calibrated for liquid with a specific gravity of 1.079. By using suitable correction factors, and by changing a setting, different solutions can be used. This allows considerable flexibility in formulation. It is also expected that the use of anhydrous ammonia will help to reduce the overall costs of granulation. The amount of anhydrous added will generally contribute less than 30-40% of the total available nitrogen in a given mix.

The dry feed including fines from the screen and dust collectors, and the liquids, are combined in the T.V.A. type ammoniator, and then are transferred to the granulation unit, or in the case of normal grades, are transferred to storage where curing is completed. In the case of granular goods, aeration and cooling takes place in a rotating cooler. The granules (or regular mixed goods) are then packed and shipped, thus completing the final phase of operation.★★


TYPICAL INSTRUMENTATION
NH_3 SHOWN
MERCURY SWITCH
110 VOLTS
TIME DELAY RELAY
AIR BLEED TO ATMOSPHERE
SOLENOID VALVE
"Mechanical Linkage"
Ties in Recorder & Totalizer To Actual Flow
CONTROLLED AIR SOURCE
This unit senses any difference between actual flow & desired flow & by sending a controlled air supply to the diaphram valve, effects the correction necessary
"SENSING CONTROL"
DIAPHRAM CONTROL VALVE
MECHANICAL LINKAGE
Clean Air Supply To Instruments
FLOW CONTROL VALVE
FLOW METERING DEVICE
BLEED
REFRIGERATION COOLER
NH_3 FROM SUPPLY
BLEED TO ATMOSPHERE
NOTE:
INSTRUMENTATION FOR ACID, AMMONIA SOLUTION, & WATER ARE SIMILAR, EXCEPT NO COOLER REQUIRED.

'56 insecticide, herbicide tests discussed at OPI meeting

Tour chairman C. R. Neiswander of the Ohio Experiment Station and OPI President M. G. Farleman admire some roses on the Station campus during the group's tour.

R. R. Davis, OAES lawn specialist, points out some particularly good control of crabgrass to a tour group of the Ohio Pesticide Institute.

NEW research bordering on the spectacular, and other reports that told a negative story because of unseasonable weather, characterized the annual summer meeting of the Ohio Pesticide Institute, August 14 and 15, at the Ohio Agricultural Experiment Station, Wooster.

"This has been one of the most complete and comprehensive OPI meetings we have ever had," declared OPI president M.G. Farleman of Standard Oil. "It is gratifying that agricultural agencies such as this (OAES) are broadening their research to include so wide a field."

Commanding particular attention from OPI members were the reports on insect control by entomologist J. P. Sleesman of the Ohio Station staff. Mr. Sleesman showed vegetable plots where he is testing 19 different chemicals for control of cabbage worms, bean beetles, mites and potato leafhoppers. Endrin and OS-2046 (Shell's Phosdrin) were particularly good in cabbage plots for checking worm damage. Endrin was applied at 1 lb. per 100 gallons of water; OS-2046 at half that rate.

It was pointed out that OS-2046 will hold special appeal to growers, because Food and Drug regulations allow the material to be applied to vegetables as late as one day prior to marketing.

Mr. Sleesman also reported on tests using granular insecticides added to the soil, or side-dressed as a means of controlling beetles on limas. Beetle population was practically nil in these tests. A soil application of Thimet at 3 lbs. per acre gave good control of leafhoppers on potatoes through its systemic action. He also recommended a seed treatment at the rate of 4 lbs. per 25 bushels of potatoes. No particularly favorable systemic action was noted by treating cabbage plots with granular insecticide.

OPI visitors were informed that today's high-powered insecticides minimize many of the earlier problems encountered in pressure variations in spray applications and plant coverage.

Heavy rainfall, high winds and generally unseasonable weather in much of Ohio interfered with some pesticide tests at the Ohio Station. One in particular was that dealing with fireblight on apple trees. Plant pathologist Frank Winter carries on his research with fruit diseases in a special orchard with fairly accurate control of conditions. (Mr. Winter was one of the first pathologists to announce successful control of fireblight with streptomycin.) This year, however, he reported secondary spread of the disease into blocks of trees where it was not wanted.

Mr. Winter also reported on earlier experiments to test the usefulness of additives to a 100 ppm streptomycin spray, and to check the effect of prevailing temperature on degree of control. None of the additives such as Captan, Phix, sulfur or tribasic copper sulphate increased the effectiveness of streptomycin. Mr.

Ohio Station variety plots of vegetables presented a contrasting picture in results of spray applications. Center strip of cabbage shows worm damage where soil treatment failed to give protection.

Winter said, however, this was no proof that such additives are incompatible, although further tests may indicate they are.

Contrary to experiments in at least one other state, pathologist Winter stated there was no difference in degree of control of fireblight when applied at either high or low temperatures. In this instance, rapidly varying weather conditions may have been a factor.

For the first time in the history of OPI summer meetings, the two-day program included discussions on chemicals in the field of woodland management and wood products. O. D. Diller, chairman of the Ohio Station's forestry department, took visitors on a mile-long tour of test woodlots and described three different projects.

Several American chestnut trees were treated with a Goodrich latex solution in an effort to prevent blight infection. Mr. Diller said that so far the latex film is keeping blight spores from entering cracks in the bark. The material is applied with a paint brush to the main trunk of the tree only.

At a fence post "graveyard" OPI members saw dozens of different kinds of wood posts treated with both creosote and copper naphthenate. Records to date show some slight advantage to posts treated with creosote, regardless of whether dip or pressure method is used.

Mr. Diller also showed the group how a hormone brush killer—2,4,5-T can be used to rid woodlots of unwanted undergrowth of dogwood by thoroughly saturating the root base and trunk to a height of 18 inches.

Weather conditions in Ohio this year fostered conditions critical to development of some diseases and weed pests. During a tour of the lawn plots, lawn specialist R. R. Davis pointed out that PMA, either wet or dry, does an outstanding job of killing crabgrass. Both wet and dry materials had been applied as a post-emergence treatment about July 10 and continued weekly for 5 weeks.

Best control of dollar spot on golf green test plots resulted from applications of Scutl plus actidione, and Kromad plus Cadminate. Chlordane at 5 lbs. per acre killed webworms and cutworms on bent grass.

Veteran horticulturist Carl Ellenwood of the Ohio Station staff said growers must use judgment in applying thinning materials to fruit trees. Weather, apparently, is a strong factor, and this year it was possible to overthin with naphthalenacetic acid. Dealers were advised to caution anyone using a thinning material such as Elgetol® near dwellings, since spray drift may discolor the paint. Mr. Ellenwood said it is possible to remove all the fruit from a tree without hurting its vigor when a home-owner wants it for shade alone. Recommended rate for Elgetol is 4 pints per 100 gallons of water.

OPI visitors saw an unusual demonstration of blossom kill on a second generation Johnny Appleseed tree. One limb had been untreated to show how the material may be used selectively.

Under several Station apple trees, Mr. Ellenwood had applied amino triazole at the rate of 1 lb. in 25 gallons of water for a 100 percent kill of poison ivy. While this material gives satisfactory results for orchardists, it is slower acting and more expensive than regular brush killer. The chemical leaches out in 2 or 3 weeks to allow planting of ground cover.

Last year plant pathologist J. Dean Wilson received scattered reports from large potato growers that a potato stalk rot was killing many of their vines. At the Wooster meeting he reported no progress in choosing an effective chemical for control, although he had isolated the bacteria causing the disease. Mr. Wilson also said he is still trying to find a material to check tomato anthracnose.

Graduate assistant Henry Shaver of Ohio State University reported on some cat-facing damage to peaches from the oak plant bug where orchards are located near woods with oak and hickory trees growing. In tests this year, parathion is giving 95 percent control against this damage.

Frank Winter reported there was some tendency in Station orchards to cause russetting this past season. A promising new material to control this damage is AC-5223 used at 1½ lbs. in 100 gallons of water. Percent

(*Continued on Page* 133)

YOU INCREASE PROFITS WHEN YOU USE

TRIANGLE BRAND COPPER SULPHATE

IN YOUR FUNGICIDE AND FERTILIZER FORMULATIONS

Since 1885, successful growers have preferred Triangle Brand Copper Sulphate in fungicides. It has consistently proved itself more effective and superior to organic materials; in sprays, where Bordeaux Mixture is the most reliable, or in dusts, if preferred.

In mixtures and emulsions, it is compatible with virtually every other pesticidal material. In fertilizers, it is important for enrichment of the soil and its use guarantees larger, healthier and more profitable crops. Forms of Triangle Brand Copper Sulphate available are:

INSTANT (powder) for quick and efficient mixing of Bordeaux sprays.

DIAMOND (snow) small or large crystals, all containing 25.2% metallic copper.

BASIC Copper Sulphate in powder form, containing 53% metallic copper.

Contact us today for further information on TRIANGLE BRAND COPPER SULPHATE and its use in your agricultural formulations.

PHELPS-DODGE
REFINING CORPORATION
300 PARK AVE., NEW YORK 22, N.Y.
5310 W. 66th STREET, CHICAGO 38, ILL.

Highway Program, Miller Law, Research, Featured in Program at NAC Fall Meeting, Sept. 5-7

THE program is set, the speakers are primed, and the reservations are rolling in for the 23rd annual meeting of the National Agricultural Chemicals Association at Spring Lake, N. J., Sept. 5-7. Indications are that it will probably be the best attended meeting in the association's history, with members, speakers, and panel members from all sections of industry, and from throughout the country.

In addition to the principal speakers, there will be three major panel discussions: "Who and What Influences the Grower in His Selection and Use of Pesticides," "Pesticides Place in the Expanded Highway Program," and "The Miller Pesticide Residue Amendment."

The meeting will also feature a presidential address by W. W. Allen, The Dow Chemical Co.; a report on "Entomology Research in the USDA," by Dr. E. F. Knipling, of the USDA; and an address on "The Industry Outlook," by J. V. Vernon, president, Niagara Chemical Division, L. S. Hitchner, NAC executive secretary, will give a graphic annual report on "What NAC Does With Your Dollar."

Social events at the meeting include a golf tournament the afternoon of September 6th; a reception, September 5th, and the annual banquet, September 6th.

NAC PROGRAM

Wednesday, Sept. 5

9:45 A.M. Meeting Called To Order
Dr. Alfred Weed, Olin Mathieson Chemical Corp.
10:00 A.M. President's Address
W. W. Allen, The Dow Chemical Co.
10:30 A.M. "Entomology Research in the USDA" Dr. E. F. Knipling, Entomology Research Branch ARS, USDA
11:00 A.M. Panel Discussion — "Who and What Influences The Grower in His Selection and Use of Pesticides."
Moderator: M. R. Budd, Hercules Powder Co.
Panel Members:
Dr. Ellsworth Fisher, University of Wisconsin.
Blanchard J. Smith, Chipman Chemical Co.
W. A. Haffert, Jr., New Jersey Farm and Garden.
John McDonald, National Association of Television and Radio Farm Directors, Station WSM.
Chief Jones, Farm Chemicals Dealer.
7:30 P.M. Board of Directors Dinner Meeting.

Thursday, Sept. 6

9:45 A.M. Introduction of newly-elected NAC president.
10:00 A.M. Panel Discussion—"Pesticides Place in the Expanded Highway Program."
Moderator: Jack Dreessen, NAC Association.
Panel Members:
C. O. Eddy, Niagara Chemical Division, Food Machinery and Chemical Corp.
W. C. Greene, Connecticut State Highway Dept.
H. F. Clemmer, American Road Builders' Assn.
R. J. McMahon, McMahon Bros., Inc.

Friday, Sept. 7

9:30 A.M. "What NAC Does With Your Dollar — Graphic Annual Report"
L. S. Hitchner, NAC Executive Secretary, and Staff.
10:30 A.M. Panel Discussion — "On the Miller Pesticide Residue Amendment"
Moderator: L. S. Hitchner, NAC Association Executive Secretary.
Panel Members:
Winton B. Rankin, FDA, Dept. of Health, Education, and Welfare.
John T. Coyne, Pesticide Regulation Section, Plant Pest Control Branch, ARS, USDA.
Dr. George C. Decker, Illinois State Natural History Survey Division.
11:30 A.M. "The Industry Outlook"
J. V. Vernon, Niagara Chemical Division, FM & C Corp.

HAZARDS

during application of pesticides

A serious criticism of "guesses" made about the occupational hazards of application of pesticides is voiced in an article entitled "Hazards During Application of Pesticides" by E. F. Edson, of Fisons Pest Control Ltd., Cambridge, England. Appearing in Vol. 7 of the *Journal of the Science of Food and Agriculture,* published in London, the article points out that a real need exists for detailed investigation data to supplant present "gross observations of very limited utility."

The dangers involved in the application of the various pesticides vary with the job to be done and the particular pesticide to be employed, but it is urged that they must always be a prime matter of consideration. Mr. Edson points out:

"During the work there is a likelihood, unless care be deliberately taken to prevent it, of concentrated chemical contaminating the exposed skin, clothing, and equipment used. During spraying there is the further risk of airborne spray-mist contaminating skin, clothing, equipment, exposed food and drink. If spray-mist is carried to the breathing zone, then chemical particles and vapor will be inhaled, retained and absorbed through the respiratory tract. Some risk of swallowing a chemical arises from contamination of fingers, tools, food and drink, and from blowing or sucking at blocked jets. The duration of exposure under such conditions may be limited to a few hours or days in a year for the ordinary farm-employee, depending upon the size of the farm and the acreage to be treated. Some workers are, however, professional spraying operators, and may carry on spraying for weeks or months on end, when free from hold-ups due to heavy rain, strong winds, breakdowns, or other causes. We have, therefore, the interesting problem of men carrying out a job during which appreciable external and internal communication by a chemical may occur, and using chemicals which, although most carefully selected for their specificity of action against the pest, are rarely more than partially species-selective.

"The potential health risk is that under the conditions of use,—the intake rate of chemical into the body, by absorption through skin, lungs, and digestive tract, may exceed the rate with which body defences can cope safely. The probability of this occurring depends mainly upon three factors: dangers of the chemicals; dangers of different application techniques, equipment and worker habits; and dangers from increasing duration of exposure—all of vital importance."

Dangers of the Chemicals

IN the chart accompanying this article, Mr. Edson presents an assessment of comparative occupational dangers of several commercial chemicals. The chart is based on the toxicological data known about each of the products. He used, for this assessment, the assumption that the test subject is an average inexperienced worker, using average equipment, carrying out a fairly large operation of 10-15 days' work, and wearing working clothes and rubber boots.

On the matter of specific recommendations and findings, Mr. Edson lists the following:

(1.) Hazardous chemicals should always have a distinctive warning color, so that contamination can be quickly recognized and dealt with.

(2.) Manufacturers should devote still more effort to providing non-splashing pouring devices, chemical packs which permit the chemical to be loaded into the spray tank without much or any risk of splash or smear, closures which do not require dangerous manual force to open, and formulations which reduce the probability or consequences of splashes of concentrate on the skin.

(3.) Absorption of unremoved splashes of concentrate on the skin is one of the greatest sources of potential danger in the field, especially from chemicals inside gloves, and during hot weather conditions.

(4.) The main inhalational hazard during application of all the chemicals listed in the table is due to airborne particles of spray-mist or dust. Even invisible particles may cause eventual over-absorption.

(5.) Atmospheric concentrations of chemical vapor alone hardly ever cause a significant health risk during outdoor operations.

(6.) Almost all the more hazardous chemicals are partially cumulative in their effects within the body. Slight over-absorption occurring on one day is then partly carried forward to become additive to that of the next day. This is a source of special danger in the dinitro weedkillers and the organic phosphorus insecticides.

(7) For both the last-mentioned groups of chemicals, sensitive analytical methods exist by which a small blood sample can be used to find out whether the recent working methods are safe or unsafe. These tests are particularly valuable where the worker's duration of exposure is long, as in contact spraying.

(8.) With most dangerous chemicals, the earliest symptoms of poisoning are usually vague and non-specific. Usual indisposition coming on during or shortly after the use of hazardous pesticides must not be ignored.

9. Since there are as yet no life-saving antidotes to poisoning by agricultural pesticides (with the partial exception of atropine sulfate in the treatment of organo-phosphorus poisoning) the problem faced by worker, employer, manufacturer, and the government is that of preventing poisoning from occurring.

Dangers of Techniques and Equipment

IN the matter of these dangers, the author makes the following points:

(10.) If the worker cannot avoid breathing dangerous spray-mist (by changing his position relative to airborne spray drift) then he should protect his lungs by wearing an effective, properly fitting dust mask with serviceable filters.

(11.) Other factors being equal, outdoor operations are less hazardous than indoor operations. Greenhouse work with the hazardous chemicals is apt to be particularly dangerous because it is usually independent of the weather outside, is carried out at close range with restricted contamination, and may produce persistent contamination of surfaces in the greenhouse.

(12.) Soil application, by 'watering-on' the diluted chemical, eliminates the risk of inhalational hazards due to particles, and reduces still further the already small vapour concentrations which may occur in outdoor spraying.

(13.) High-volume spraying, i.e. using large volumes of more dilute spray, is likely to be less hazardous than low-volume, mainly because the higher chemical content of low-volume liquid causes greater danger from skin splashes.

(14.) The use of enclosed tractor-cabs, fitted with sun-canopy and swept freely by cool, filtered air, is a worthwhile protective measure during prolonged contract operations with hazardous chemicals.

Duration-of-Exposure Dangers

MR. EDSON cautions that the danger increases sharply when campaigns continue through successive weeks. "Workers tend to become rather tired and casual. Campaigns are more likely to occur during periods of fine and fairly hot weather, when climatic factors cause more fatigue and more rapid chemical absorption by the skin.

For prolonged or intensive campaigns, the author warns that workers should:

(a) have regular blood tests so that they can be withdrawn from the job as soon as unsafe blood levels are approached; or

(b) be frequently rotated in duties so as to share the more risky jobs among more than one individual; or

(c) have their hours of work deliberately curtailed, preferably to exclude the hotter hours of the day, so as to reduce the chances of dangerous over-absorption.

During the course of the article, which also lists the main requirements of the British Agriculture (Poisonous Substances) Regulations, the author stresses the importance of manufacturers' and statutory safety requirements. He urges that they be known by both worker and supervisor.★★

Announce NSC Oct. Program

The Fertilizer Section of the National Safety Congress has announced details of its program for its safety meeting October 22 and 23 in Chicago. Among the speakers are several industry leaders, plus some authorities on safety and accident prevention. In addition to regular business the program is as follows:

October 22, 1956, Monday

Presiding: Mr. Curtis A. Cox,
Virginia-Carolina Chemical Corp.

"Safety Is Top Management's Concern"
H. B. Devinny,
Davison Chemical Company

"The Safety Director In a Multiple Unit Organization"
J. Lauren Shopen, Consumer Co-op Assn.

"The Safety Committee In the Plant"
C. S. Griffith,
Virginia-Carolina Chemical Co.

October 23, 1956, Tuesday

"Safety Program for the Average Plant"
H. S. Baucom,
North Carolina Industrial Commission

"Florida Cooperates—Not Regulates Work With Your State Department"
C. E. Hooks, Jr., Florida Industrial Commission

Safety assessment of agricultural pesticides

Safe

- Derris
- DDT
- BHC, lindane
- Copper fungicides
- Hormone weedkillers
  - 2,4-D, 2,4,5-T, MCPA, MCPB, etc.
- Borate
- Chlorate
- Monochloroacetate
- *Trichloroacetate
- *CMU
- PCPBS
- IPC
- Maleic hydrazide
- *Sulphur
- *Lime-sulphur
- *Sulphuric acid
- *TVO
- *Tar-oil-fractions
- Malathion
- *Dithiocarbamates
- Pyrethrum
- Lead arsenate

Intermediate

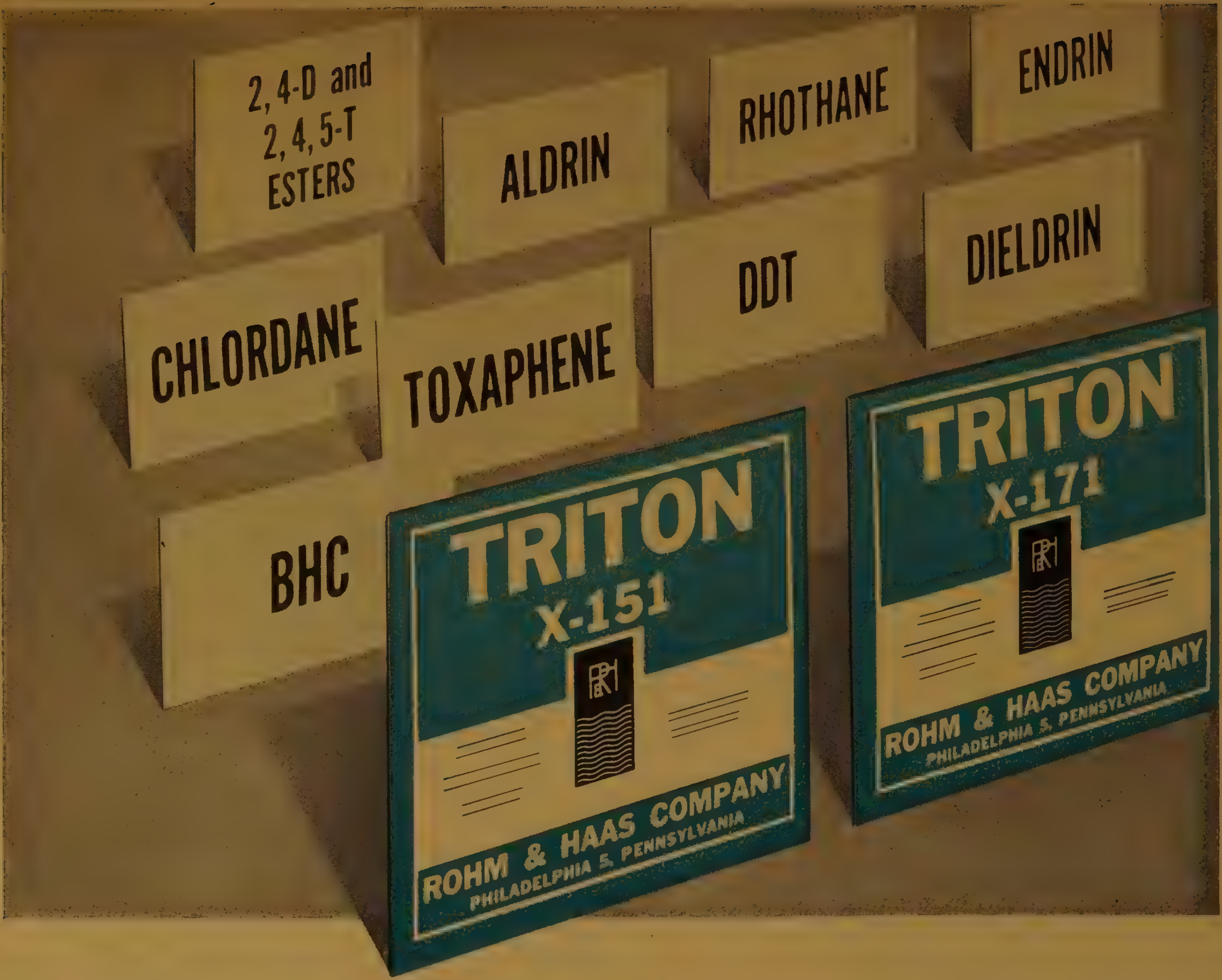
- *Pentachlorophenol
- Dieldrin
- Aldrin
- Endrin
- Methyl-demeton
- Diazinon
- *Organic mercurials

Hazardous

- Nicotine
- *Arsenites
- Dinitro weedkillers DNC, DNBP, DNOCHP
- Organo-phosphorus insecticides—Parathion
  - TEPP (HETP)
  - Demeton
  - Schradan
  - Sulphotepp
  - Dimefox

*May cause skin irritation on prolonged or severe contact.

(With the chemicals listed as "safe" the worker probably would have no general ill-effects attributable to the chemical. With the "hazardous" group he could develop minor or major ill-effects before he finished the campaign, varying from vague indisposition to severe illness, or worse. In the "Intermediate" group laboratory tests suggest that their dangers lie somewhere between safe and hazardous.)



Only two TRITON emulsifiers needed for better agricultural formulations

TRITON X-151 and TRITON X-171 emulsifiers combine the ability to solve many emulsion problems with improved color, solubility, and storage stability. Formulators can prepare almost any type of emulsifiable concentrate with *only these two* emulsifiers. The toxicants in the illustration are but a few of the many that can be used with TRITON X-151 and X-171.

Here are just three of the benefits you can expect when you standardize on the TRITON twins:

Better Formulations—TRITON X-151 and TRITON X-171 give you emulsifiable concentrates with better clarity and improved spontaneity. Storage stability is also outstanding inasmuch as the non-ionic portion of the TRITON twins is based on breakdown-resistant ethers. Concentrates are therefore better able to resist the excessive acidic conditions which may develop during storage.

Simplified Operations—Only these two TRITON products are required for a wide variety of toxicant-solvent systems and water hardness conditions. This simplifies inventory and eliminates waste if solvents or pesticides are later changed.

Lower Costs—Compare TRITON emulsifiers at equal cost concentrations with other products. You will prove to yourself that TRITON X-151 and X-171 are more economical.

Write us for samples and additional information; investigate the many advantages of TRITON X-151 and TRITON X-171 now.

TRITON *and* RHOTHANE *are trade-marks, Reg. U.S. Pat. Off. and in principal foreign countries.*

Chemicals for Agriculture

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

FERTILIZER
Views and News

By Vincent Sauchelli

Product Control in Fertilizer Manufacture

MANUFACTURERS of granulated fertilizers have to be much concerned with the control of the physical and chemical qualities of their product. They should be. For this reason methods of analysis interest them. Sampling procedures which served quite satisfactorily in the case of old-style, non-granulated fertilizers do not seem to satisfy today's pelletized fertilizers. Control officials share in this concern. Interesting investigations into the adequacy of established sampling and analytical procedures are reported from Florida* and Great Britain.** The Florida research emphasizes the importance of the sampling tool and the method of using it to draw a sample correctly. It was found that the conventional sampling tube in use by the local inspectors had a tendency to abrade many of the fertilizer particles as it is pushed through the bag. A large number of sampling tools and methods of use were studied carefully and the authorities now believe they have one which promises to give complete satisfaction.

The British researchers also investigated the sampling tube factor. In their report, they emphasize that sampling is of fundamental importance in control work. The authors adduced much evidence to support the claim that the official method of taking a sample of granulated fertilizer is unsatisfactory, and show that it is preferable to use a riffle or a coning and quartering technique in drawing a sub-sample.

We are glad to see this interest in sampling and analytical methods and hope it will become generally enthusiastic, The fertilizer industry has been somewhat backward in making serious efforts to establish the scientific data necessary for a revision of its control methods. It is suggested that the principles of statistical quality control, applied so successfully in other branches of the chemical industry, may serve the fertilizer manufacturer just as effectively. It may mean a little more work and effort for management perhaps, but I feel certain the pay off will be highly gratifying.

Weeds or Ignorance

WHEN is a weed? Well, when we are ignorant of its virtues. A research team at Michigan State College has reported that they were able to extract a chemical from the weed known commonly as St. Johnswort which has the power to destroy certain bacteria. This shrub weed from the Orient thus becomes the first plant to yield an antibiotic. Heretofore such antibiotics have been isolated chiefly from molds or fungi. It may now be possible for future investigators to explore the plant world for supplies of antibiotics obtainable at considerably lower cost. This leads one to ask why is there no systematic investigation supported by Congressional action of the chemical constituents of so many of our common weeds? We have been told that more than 300,000 species of plants in the world comprise virgin territory for scientists to explore. All the cultivated plants we now use were once "wild" and apparently most of them were not too good in that wild state. Careful breeding and cultivation conducted patiently over a long time have brought our food and fiber plants to their present high values. Similar attention, if given to many of the multitude of wild plants or weeds of the country, might pay as handsome a dividend as the St. Johnswort shrub weed.

Sodium an Essential Element?

THERE was a period not too far back when plant scientists considered that only 10 chemical elements were essential to plant growth. The orthodox list comprised nitrogen, oxygen, magnesium, sulfur, iron and calcium. As research progressed, and with refinements of analytical methods, it was determined that other elements should be included among those considered essential. In due time, five others were admitted to the nutrient list, namely boron, manganese, copper, zinc and molybdenum. These newer elements, and iron are considered as minor elements because they are needed in small amounts only. The latest element being considered as a possible candidate for the orthodox nutrient list is sodium. Many plant scientists favor its inclusion on the basis of extensive field tests. The opponents justify their attitude on the basis that plants can be grown in a nutrient solution from which sodium is excluded and that although sodium does benefit some plants, many others seem to get along well without it.

The position of the minor elements was formerly somewhat analagous to that of sodium. A special classification was at first created by which they were considered as "stimulating" but not as "essential." This let down the bars for them and, once in, the special classification was soon abandoned. Perhaps sodium, and some believe vanadium too, should be admitted on some special basis, awaiting further research to prove their essentiality conclusively.

---

*Fertilizer Control Res. Project. Unpublished; mimeo, F.A.R.I. June 1956.

**Product Control in Fertilizer Manufacture. Proc. Fertilizer Soc. Nos. 28, 35, 36.

Sodium has been applied to crops in large quantities and cheaply, in the form of sodium nitrate and also as common salt or sodium chloride. Past field tests with sodium nitrate ascribed the favorable results exclusively to the nitrogen. More recent studies, however, have identified the beneficial results for sodium and nitrogen, and give support to sodium's claim to be considered a plant nutrient. The number of crops that respond to sodium seems to be limited: one group gives good response; another, slight to medium response under conditions of soil potash deficiency; a third group gives a large response even under potash sufficiency. This last group comprises celery, sugar beet, Swiss chard, table beet, turnips and mangolds.

The best definition for sodium may be that it is a unique plant nutrient in that it is not necessary for growth but necessary for some crops to ensure maximal yields. In this regard, it is similar to potassium, which is recognized as essential to all plants but that some plants respond more to it than others. That sodium may no longer be excluded from the list of plant nutrients seems to be the consensus of the majority of plant scientists.

Uptake of Phosphorus

PHOSPHATE nutrition of plants is an ever interesting subject. Several readers have written me with reference to this subject as discussed in my November 1955 column. Soil scientists, it seems, once assumed that if a phosphate was soluble and within reach, plants could take it up, whatever its form. Today's viewpoint is that plants apparently absorb only two forms, the mono-hydrogen phosphate ion $(HPO_4)^-$ and the di-hydrogen ion $(H_2PO_4)^-$. These ions do not have the same effectiveness nor are they present in the soil in equal amounts. The relative quantity of each is dictated by the presence of another ion, the hydroxyl, (OH). The hydroxyl ions have the power of determining how much of each of these two forms of phosphatic ions may be present in the root zone at one and the same time. They interfere with the plant's ability to absorb phosphate ions by competing directly with the roots for them, or by blocking them off from reaching the plant roots.

Recent studies by scientists of the U. S. Department of Agriculture* have shown how the pH of the soil greatly influences the supply and uptake by plants of phosphate ions, and furthermore, how the concentration of hydroxyl ions regulates the amount of phosphate absorbed by a plant. These studies are interesting and can become very useful for increasing our understanding of how to employ fertilizers more efficiently.

The chemical reactions involved in these relationships may be shown in simplified form as follows: We start with a very acid soil, say pH_2, and progressively go toward neutral and on to strongly alkaline, say pH8. Now, at pH2 the (OH) ion removes one of the phosphate's hydrogen atoms to form one molecule of water (HOH). Say we start with rock phosphate: under the assumed conditions, rock phosphate releases H_3PO_4 (ortho phosphoric acid) and the (OH) ion removes one hydrogen from this acid, leaving the di-hydrogen phosphate ion (H_2PO_4). As more of the (OH) ions are formed by the complex reactions, the pH moves up toward the less acid zone and in the presence of the greater accumulation of $(OH)^-$ ions, the $(H_2PO_4)^-$ ions are bereft of hydrogen so that in the zone of pH5 to pH8 (the agricultural soil zone) the number of $(HPO_4)^{--}$ ions increases the higher the pH. Finally in the pH9 and pH10 zone, the very alkaline zone, the $(HPO_4)^{--}$ ions yield their hydrogen atoms to $(OH)^-$ ions so that the $(PO_4)^{---}$ ions predominate. How far this progression goes depends upon the concentration of $(OH)^-$ ions.

Ortho phosphoric acid, H_3PO_4, previously mentioned can be derived from the breakdown chemically of phosphate rock, apatite and other phosphatic compounds. At the very acid levels, pH2 to pH5, the (OH) ions are scarce, the phosphates present are mostly unavailable to plants. Field and pot tests are in agreement with this theory of hydroxyl dictatorship. When the pH is in the medium acidity zone—pH5 to pH 7 or 8, the abundance of (OH) ions is relatively high and the phosphates present are mostly of the (H_2PO_4) type. Under neutral conditions, pH7, the two phosphates—mono- and di-hydrogen, are about evenly balanced in numbers. As we go into the alkaline zone, pH8 - pH10 the (OH) ions are present in tremendous quantities and the phosphate ion supply is all in mono-hydrogen form. So we can say we can illustrate the progression from the very acid level to the highly alkaline as follows:

$$H_3PO_4 + (OH) \rightarrow H_2PO_4 + HOH$$
$$H_2PO_4 + (OH) \rightarrow HPO_4 + HOH$$
$$HPO_4 + (OH) \rightarrow PO_4 + HOH$$

Plants Select Their Food

APROPOS the information on the influence of the hydroxyl ion on phosphorus uptake, the following on how roots select their nutrients will answer several questions put to me.

It has long been unknown to plant scientists what exactly takes place at the root tip. Recent investigations by E. Epstein at the USDA (ARS) have removed some of the secrecy and certainly give us a better understanding of the process. It is known, of course, that plant roots absorb nutrients; but not so well-known that the nutrients are in the form of chemical ions. For example, phosphorus is taken into the plant either as the $(H_2PO_4)^-$ or the $(HPO_4)^{--}$ ion and not as the element phosphorus (P). Ammonium nitrate splits up into ammonium $(NH_4)^+$ and the nitrate $(NO_3)^-$ ions and the plant absorbs nitrogen most often in the form of $(NO_3)^-$. Each ion carries a specific electric charge, either negative or positive, depending on its nature. The attracted ions have to penetrate the cell walls of the root tip in order to get into the plant's circulatory system. How is this done?

(Continued on Page 139)

---

*C. E. Hagen and H. T. Hopkins, USDA—Agr. Res. Service.

Technical SECTION

Systemics for Control of Pests On Ornamentals

INSECT pests of ornamental plants have been controlled by insecticides applied either by fumigation or by spraying. The development of chemicals which may be absorbed into the plant and translocated has provided a new way to control some of these pests. Such chemicals are particularly useful to control sucking insects. Furthermore, there is no problem from residues in ornamental plants.

The systemic insecticides may be applied to the foliage and absorbed there. David and Kilby (1) and David (2) have shown that some materials are absorbed by the upper surface of the leaves more freely than by the lower surface. Materials were translocated from old to new foliage, and from new leaves to older leaves below.

Some materials are absorbed freely by the roots and transported to all parts of the plant. Finally, some volatile materials used as soil drenches may kill insects in the vapor phase.

Systemic insecticides have been especially effective in killing sucking insects and mites. Small chewing insects may be killed, but larger insects escape serious injury. Furthermore, parasites and predators may escape insecticides, especially when the application is made on the soil.

The effectiveness of systemic insecticides was well established before the work reported here was undertaken. The purposes of these experiments were (1) to test the effectiveness of the material on serious pests, (2) to established the dosages required, (3) to determine the effects of the chemicals on growth of the plants, and (4) to determine the length of time the insecticides are effective.

Systox and Thimet used once as soil drenches controlled mealybug on nephthytis. Two soil treatments with these systemics or compound 12008 gave good control of the insect on Chinese evergreen.

Malathion spray controlled mealybug on lemon tree.

Systox soil treatments controlled scale on nephthytis. Repeated applications injured plants. Thimet and compound 12008 in addition to Systox gave good control of euonymus scale. The first two materials were slower in action and less effective at reduced concentrations.

Thimet and compound G-22870 used as soil drenches gave complete control of aphids on chrysanthemum. Compound 12008 and Thimet produced similar results when used as soil treatments to control aphids on geranium. The strongest dilution of the three systemics caused slight marginal foliage burn to treated plants.

Two soil treatments of Systox, Thimet, and compound 12008 controlled cyclamen mites on velvet-plant and ivy. Systox was the least effective of the three systemics.

Thimet was more effective than Systox in controlling cyclamen mite on kalanchoe and cyclamen.

Endrin and Loro used as dips gave reasonably good control of cyclamen mite on the leaves of cyclamen plants but poor control in the flower buds. The treatments did not injure the dipped plants.

Control with Systemic Insecticides

Systox 20 per cent may be diluted at the rate of 1 pint in 100 gallons of water or 1 teaspoon per gallon and applied to potted plants as a soil drench at the rate of 1 ounce of dilution to each inch of pot diameter (5 ounces for a 5-inch pot). Two treatments at about 14-day intervals may be necessary for best results. Caution should be exercised, however, in repeating treatments, for accumulated toxicity may be hazardous to some plants.

Malathion 50 per cent emulsion used as a spray at the rate of 3 to 4 pints in 100 gallons of water or 3 to 4 teaspoons per gallon should give good control of mealybugs and scales. Wettable powder may be substituted for the emulsion at the rate of 6 to 8 pounds in 100 gallons of water or 4 to 5 tablespoons per gallon. Because young scales and mealybugs hatch for some time, several treatments at about 2-week intervals may be necessary to make good control a certainty.

Endrin emulsion may be used at about 4-week intervals at a dilution of 1 to 2 pints in 100 gallons of water or 1 to 2 teaspoons per gallon as an aid in preventing cyclamen mite infestation.

By J. C. Schread, Systemic Insecticides to Control Mealybug, Scale, Aphids, Cyclamen mite on Ornamentals. Buln. 200, July, 1956, Connecticut Agricultural Experiment Station, New Haven, Conn.

Results on November 21 of systemic treatments by dipping applied November 7 to control cyclamen mite on cyclamen

Material and dilution	No. of mites on leaves Dead	Alive	Per cent kill on leaves	No. of mites on flowers Dead	Alive	Per cent kill on flowers
Loro 1:800	114	58	66.2	26	97	21.2
Endrin 1:800	44	19	69.8	11	26	29.7
Untreated	8	145	....	......	......	....

PAX for Crabgrass Control

A method of killing crab grass seeds *before* they germinate, without injury to desirable turf grasses or dichondra, is recommended by University of Utah researchers. They report satisfactory results with "PAX Crabgrass and Soil Pest Control," a commercial product containing lead arsenate as an active ingredient, which has been on the market in the Western United States for over fifteen years. The manufacturer of this product recently offered a new combination of dry arsenicals known as AR-76, and chlordane.

This research program, conducted during the past three years in Utah and California, developed the new formula which is now on the market as "PAX Crabgrass and Soil Pest Control" Improved with AR-76 and Chlordane.

This new formula PAX Crabgrass and Soil Pest Control, improved with AR-76 and chlordane is a multipurpose lawn treatment which not only effectively controls crab grass by killing the dormant seeds, but also kills insect pests, including night crawlers, lawn moth larvae, grubs, cut worms, earwigs and ants. The product contains ammonium sulphate to provide nitrogen fertilizer.

The effectiveness of the new product was tested in California and in Utah under varying climatic conditions and found to be 90% to 98% effective when used according to directions. The time of application is very important as the product must be in contact with the seed prior to germination—preferably for at least two or three weeks.

AR-76 is said to remain active for a long period of time, so the product may be applied in the autumn even before some of the seeds have ripened and fallen to the ground.

In tests conducted at the University of Utah during the past three years, a single application of "PAX Crabgrass and Soil Pest Control" was found to be superior to several applications of other chemicals commonly used for crab grass control.

Some of the advantages of this product are listed as: It kills the seed prior to germination and thus only needs to be applied once any time between Labor Day and beginning of seed germination in the spring. It fertilizes the lawn and thus improves its appearance rather than discoloring it. Lawn-moth larvae, grubs, cut worms, earwigs, ants, night crawlers and other lawn pests are killed promptly with the new combination of dry arsenicals and chlordane. The product has the additional advantage of easy application with a fertilizer spreader without the need for measuring and mixing ingredients.

"Pre-Emergent Control of Crab Grass," by Dr. Irving B. McNulty, Division of Biology, Department of Botany, University of Utah, Salt Lake City.

•

Study Blight Loss, Incidence

Investigations directed toward reducing costs in control of potato blight were undertaken with additions of phenyl mercury chloride to copper oxychloride. Because copper has increased in price by 6½ times since 1945, the studies centered on lower use of copper fungicides.

The trials showed that, by the addition of 1% phenyl mercury chloride to a standard copper oxychloride dispersible powder (50% Cu), an economy of copper amounting to 40% was effected. However, it is pointed out that in the past many spraying trials have been almost meaningless because no record had been made of the timing of the spraying in relation to the course of the disease on the haulm. In the trials described, strong evidence was presented that the two sprays had the same protective effect. However, the real question is whether 0.3% copper oxychloride plus mercury will persist long enough on the foliage to give good protection when only two sprays are applied under the conditions of commercial spraying, when the applications are not given at just the right time.

An Economy in the Control of Potato Blight, Phytophthora Infestans (Mont) de Bary, by H. I. Kingston, *Journal of the Science of Food and Agriculture* (London), Vol. 7, 1956, Suppl. Issue.

Catechol Seed Treatment

The use of phenolic compounds to stimulate the formation of suberized tissue on the cut surface of potato seed pieces was a by-product of research on the nature of scab resistance. Chlorogenic acid is associated with scab resistance and is a phenolic compound. It was noted that when pure chlorogenic acid is applied to the fresh cut surface of a tuber, a very tough protective layer of suberized cells forms rapidly. Since chlorogenic acid is very expensive, several less expensive phenolic compounds were found to produce the same result—a layer of suberized cells. A relatively cheap phenolic compound, catechol, was found to be very effective.

The C.P. grade of catechol contains undetermined amounts of free phenol that can cause injury, hence it is advisable to use the resublimed grade. The resublimed grade of catechol is readily soluble in water at a concentration of fifteen hundredths of one per cent (.15%) and is the recommended concentration for treating cut seed. Fresh cut seed pieces are dipped, drained immediately, and allowed to dry. They can then be stored in one-half sacks or crates for periods of one month or longer, providing storage temperatures are kept between 40° and 50° F.

The catechol stimulates the production of suberized cells on a cut surface and also reacts with the enzyme tyrosinase present in the tuber tissue to produce quinones that are extremely toxic to fungi and bacteria. The stimulation of the production of suberized tissue starts immediately after treating and a tough, pliable layer of the tissue gives the cut surface a brown velvety appearance. This protective layer does not crack or readily sluff off, affording effective protection. Since any liquid seed treatment of cut seed is less desirable than a dust treatment, experiments are being conducted to determine a method of formulating finely ground resublimed catechol with a carrier, such as talc.

Treating Cut Seed Potatoes with Catechol, by Lawrence A. Schaal. *Potato Handbook*, 1956.

Modified
Polyethylene
Coating . . .

GIVES

25% MORE MOISTURE PROTECTION

Laboratory tests show–and users confirm–that LADCOTE extruded coatings–one mil or less–transmit 25% less water vapor than conventional polyethylene of equal coating weight.

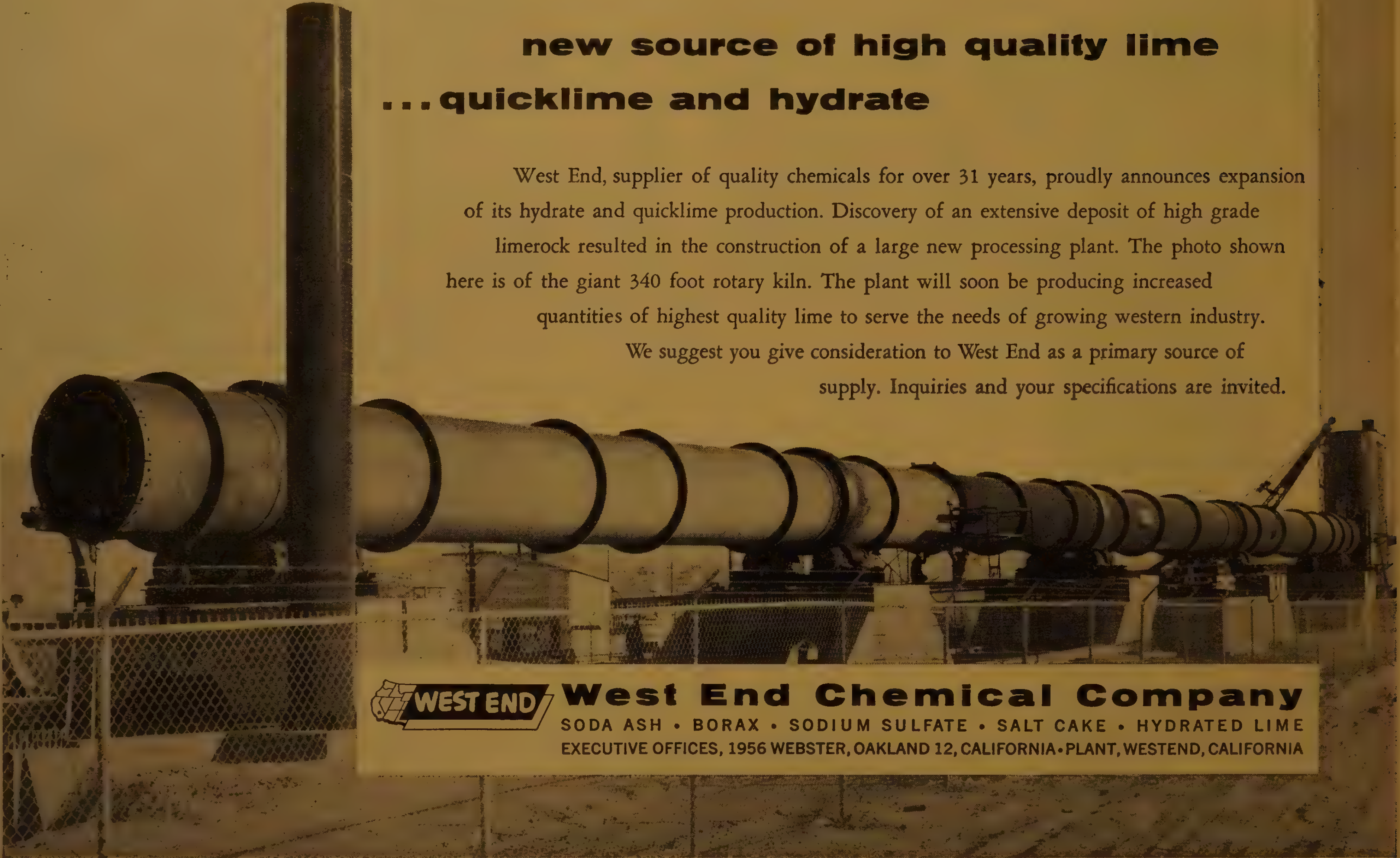
LADCOTE withstands ACIDS ALKALIES MOISTURE

LADCOTE is now being used to protect NITRATE FERTILIZERS FEEDS AGRICULTURAL CHEMICALS

When you order bags, specify LADCOTE COATINGS
For a list of bag manufacturers supplying
bags coated with LADCOTE Compounds, write to:

L. A. DREYFUS COMPANY

P. O. Box 500 • South Plainfield • New Jersey



new source of high quality lime

. . . quicklime and hydrate

West End, supplier of quality chemicals for over 31 years, proudly announces expansion of its hydrate and quicklime production. Discovery of an extensive deposit of high grade limerock resulted in the construction of a large new processing plant. The photo shown here is of the giant 340 foot rotary kiln. The plant will soon be producing increased quantities of highest quality lime to serve the needs of growing western industry.

We suggest you give consideration to West End as a primary source of supply. Inquiries and your specifications are invited.

WEST END **West End Chemical Company**

SODA ASH • BORAX • SODIUM SULFATE • SALT CAKE • HYDRATED LIME

EXECUTIVE OFFICES, 1956 WEBSTER, OAKLAND 12, CALIFORNIA • PLANT, WESTEND, CALIFORNIA

New Books

Principles of Fungicidal Action, by James G. Horsfall. Published by The Chronica Botanica Co., Waltham, Mass. and Hafner Publishing Co., New York. 279 pages, price $6.50.

This book discusses measurement, protection, the action of metals, effect on metabolism of fungi, and other considerably more technical aspects of this destructive pest. The author, director of the Connecticut Agricultural Experiment Station at New Haven, has gone far toward bringing together all current information on mechanisms of fungicidal action, striving to distinguish between permeation and inherent toxicity on all points. His studies of the chemistry of protection and the mechanisms of fungitoxicity should be of considerable value to manufacturer and dealer of fungicides, and other agricultural chemicals.

Polyfon Insecticide Dispersant

A seven-page Technical Bulletin No. 306 describing the use of "Polyfon," sodium lignosulfonate, as a low price, moderately active dispersant in wettable insecticide powders has been published by the Polychemicals Division, West Virginia Pulp and Paper Company, Charleston, W. Va., and is available upon request.

Polyfon is made in five grades varying in degree of sulfonation. Three of the grades, Polyfon H, Polyfon T, and Polyfon F, are offered as dispersants for wettable powders. The grade selected for any formulation is dependent on the carrier, the toxicant, and also the equipment and process used in preparing the powders.

In insecticide compounding and in other fields, the bulletins say that Polyfon is particularly valuable because of the absence of wood sugars, hemicelluloses and other degradation products of wood. This reportedly eliminates any tendency toward caking, fermentation, or mold growth. This feature is of importance particularly in wettable powders intended for use in tropical or semi-tropical conditions, where heat and high humidity may cause undesirable effects in less stable materials.

The bulletin describes the properties of the dispersant and gives instructions for preparing insecticide wettable powders. A wide variety of toxicants have already been successfully formulated into wettable powder using Polyfon as the dispersing agent. The formulas described have been used commercially, but other carriers and wetting agents can also be used.

Among the formulations given are those for DDT, dieldrin, aramite, heptachlor, toxaphene and malathion. Polyfon has also been used successfully in making wettable powders with chlordane, BHC, parathion, aldrin and Diamond Alkali K-101.

Apple Scald Control

Use of emulsified oils has been suggested as a means of controlling apple scald disease, but their use hasn't been substantially more successful than use of oiled paper, the standard control method. Cornell University results have shown erratic control of scald with oils over a period of seven years. Some of the fruit is off-flavor, and it is always slightly greasy. This control method has not been approved by the Federal Food and Drug Administration.

The use of sealed 150-gauge polyethylene box liners also has not offered consistent control results. On the other hand, these have sometimes increased the scald in the Cornell studies.

Experimentally, two "scald inhibitors" have given good control. The fruit is merely dipped in a very weak suspension of the material after harvest. Diphenylamine has reportedly shown considerable promise in this application. In the Cornell studies, however, it has not controlled spot scald on Rome Beauty. Santoquin has shown promise in trials at Ithaca, but has not been tested elsewhere. Neither of these materials can be used commercially until approved by the Food and Drug Administration.

R. M. Smock and G. D. Blanpied, *Farm Research,* Vol. XXII, No. 3, July 1956.

Horticultural Review

Applied Phytopharmacy, special section, *The Chemist and Druggist,* April 7, 1956

Five topics are covered in this special horticultural number: a) developments in fungicides; b) antibiotics in agriculture; c) viruses in crop protection; d) three years in a horticultural department; ;and e) soil conditioners.

Copper, sulfur, mercury, organic and systemic fungicides are discussed in part (a) with special emphasis on the most recent development - antibiotics as fungicides. Streptomycin is of great interest and rimocidin (produced by *Streptomyces rimosus*) and filipin are reported to be effective for seed treatment, particulary on peas for the control of *Ascochyta pisi.*

Effective antibiotics for fungal disease are reported to be: cyclohexi-mide, Helixin and endomycin, toximycin, antimycin A and griseofulvin. The latter is expected to be the first antibiotic (in the British Isles) to be released for general treatment of antifungal infections in plants. It is systemic in action and its effect is unusual in that gross distortion of the growing tips of the fungal hyphae is produced. When that distortion occurs within a plant, the fungus is unable to pass from cell to cell. The compound is produced from *Penicillium nigricans.* Suggested uses are for control of: bottom rot of lettuce, bitter rot of apples, apple scab, petal blight of camellia, verticillium wilt of tomato, bud blast of rhododendron, anthracnose of cucumber, silver leaf of plum, apple canker, stem rot of tomato, leaf spot of celery and others.

Uses of viruses to control insect pests is discussed, citing successes with polyhedral and granular viruses against larvae of sawflies, caterpillars, nettle grub, etc.

A few notes regarding the organization of an horticultural department are given.

Conclusion of the soil conditioners discussion is that the market at present for polymeric soil conditioners (in Britain) seems to be small, the limiting factor being the cost.

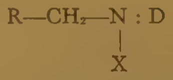
INDUSTRY *Patents*

The data listed below is only a brief review of recent patents pertinent to the readers and subscribers of this publication.

Complete copies of these patents may be obtained by writing to the publisher of this magazine and remitting 50¢ for each copy desired. For orders received outside of the United States the cost will be $1.00 per copy.

2,732,291. Low Volatility Herbicidal Compositions. Patent issued January 24, 1956 to William R. Davie, Pittsburgh, Pa., assignor to Pittsburgh Coke & Chemical Co., Pittsburgh, Pa., a corporation of Pennsylvania. A herbicidal mixture of esters characterized by its low volatility, said mixture being the esters of (1) 2,4,5-trichlorophenoxyacetic acid and (2) a mixture containing a substantial quantity of each of at least three primary saturated octyl alcohols selected from the group consisting of trimethyl pentyl alcohols, dimethyl hexyl alcohols and methyl heptyl alcohols, in which said methyl groups are attached to the 3, 4 and 5 carbon atoms.

2,734,815. Herbicides. Patent issued February 14, 1956 to David T. Mowry and Arthur H. Schlesinger, Dayton, Ohio, assignors to Monsanto Chemical Co., St. Louis, Mo., a corporation of Delaware. The method of destroying undesirable plants which comprises applying to said plants a herbicidal composition containing as the active ingredient a quaternary nitrogen compound having the general formula



$$R{-}CH_2{-}\underset{\displaystyle X}{\underset{|}{N}}:D$$

in which R is selected from the class consisting of alkyl-substituted phenyl radicals and alkyl-substituted naphthyl radicals in which the number of alkyl substituents is from 1 to 3, in which each alkyl radical has from 1 to 12 carbon atoms, and in which the total number of carbon atoms in the alkyl radicals is from 3 to 12, X is selected from the class consisting of chlorine and bromine, and N:D denotes a heterocyclic nitrogen compound of the pyridine series consisting of pyridine, quinoline and isoquinoline and C-linked homologues thereof containing from 1 to 3 C-alkyl substituents, the number of carbon atoms in each of the C-alkyl substituents being from 1 to 2, said active ingredient being present in phytocidal concentration.

2,734,816. Plant Regulators. Patent Issued February 14, 1956 to John W. Wood, Silver Spring, Md., Thomas D. Fontaine, Abington, Pa., and John W. Mitchell, Silver Spring, Md., assignors to the United States of America as represented by the Secretary of Agriculture. A derivative of a D-amino acid wherein the amino acid has been acylated with a nuclearly chlorinated phenoxyacetic acid.

2,739,036. Ammonium Nitrate Prill. Patent issued March 20, 1956 to Joseph L. Kamenjar and Herbert R. Antle, Dumas, Tex., assignors to Phillips Petroleum Co., a corporation of Delaware. In a process for the production of granular ammonium nitrate wherein ammonia is reacted with nitric acid to produce a solution of ammonium nitrate, the thus-produced solution concentrated to within the range of 94 to 97 weight per cent, the thus-concentrated solution passed to a prilling zone, and granular ammonium nitrate recovered therefrom, the improvement which comprises adding a minor amount of ammonia to the thus concentrated solution after concentration and before passing same to the prilling zone.

2,739,037. Processing for Production of Ammonium Nitrate. Patent issued March 20, 1956 to Leonard A. Stengel, Terre Haute, Ind., and John J. Dorsey, Jr., Monroe, La., assignors to Commercial Solvents Corp., Terre Haute, Ind., a corporation of Maryland. In a process for producing ammonium nitrate by reacting ammonia vapors with nitric acid at a pressure of at least atmospheric pressure in a packed reaction zone and continuously removing steam and molten ammonium nitrate therefrom as reaction products, the improvement which comprises passing the said reaction products directly from the reactor into a steam separator maintained at a temperature ranging from about 350° F. to about 425° F. and at a pressure below about 23 inches of mercury absolute, the residence time of the molten ammonium nitrate in the separator being maintained below about five seconds.

2,739,053. Dust-Free Herbicidal Composition and Method of Making Same. Patent issued March 20, 1956 to Henry L. Morrill, Clayton, Mo., assignor to Monsanto Chemical Co., St. Louis, Mo., a corporation of Delaware. The method of preparing a free-flowing granular substantially dust-free herbicidal composition which consists in mixing a herbicidal mixture comprising a haloaryloxy substituted aliphatic acid with volcanic sand having a particle size of 0.5-5 mm. wherein the weight of the haloaryloxy substituted aliphatic acid does not exceed the weight of the volcanic sand, subjecting the mixture while agitating to a temperature above the fusion temperature of the said acid, and cooling the resultant mixture whereby the free-flowing granular substantially dust-free herbicidal composition is obtained.

2,739,054. Method of Producing Phosphated Fertilizers. Patent issued March 20, 1956 to Louis E. Andres, St. Gratien, and Jean L. Iragne, Villeneuve La Garenne, France, assignors to Potasse & Engrais Chimques, Paris, France, a societe anonyme of France. A process for the manufacture of a complex fertilizer which has a pH not substantially lower than pH 7 and substantially free of tricalcium phosphate and containing nitrogen in the form of nitrates and nitrogen in ammoniated form and phosphoric acid in the form of phosphates soluble in ammonium citrate, which comprises treating a natural phosphate rock containing substantial amounts of tricalcium phosphate with nitric acid followed by the step of neutralization of the mass without any removal of salts of calcium from the mass and prior to said neutralization step adding to the reaction product of said natural phosphate and acid sufficient quantities of magnesium and of sulphate ions to insure that at least 20 molecules of Mg and 20 molecules of SO_4 to 100 molecules of P_2O_5 are present in the mass, said magnesium ions acting to prevent formation of phosphate in a form which is insoluble in ammonium citrate thereby producing a neutral fertilizer free from phosphate in a form which is insoluble in ammonium citrate.

2,741,115. Herbicidal Composition. Patent issued April 10, 1956 to John C. R. Warren, Elmira, Ontario, Canada, assignor by mesne assignments, to the Dow Chemical Co., Midland, Mich., a corporation of Delaware. A concentrated herbicidal composition of matter which will not freeze at temperatures as low as 0°C. and which comprises from 5 to 65% of a liquid hydro-carbon and correspondingly from 95 to 35% of a mixture of the n-butyl and isobutyl esters of 2,4,5—trichlorophenoxyacetic acid in proportions of from 30 to 70% of said n-butyl ester and correspondingly from 70 to 30% of said isobutyl ester, said first-named percentages being by weight based on the sum of said hydrocarbon and said mixture and said last-named percentages being by weight based on the sum of said esters.

2,741,116. Concentrated Herbicide Compositions. Patent issued April 10, 1956 to James H. Fookes, Hope, Mich., assignor to the Dow Chemical Co., Midland, Mich., a corporation of Delaware.

A concentrate composition comprising as an active herbicide toxicant a mixture of the normal butyl ester of 2,4,5-trichlorophenoxy-acetic acid and the isobutyl ester of 2,4,5-trichlorophenoxyacetic acid, said normalbutyl ester comprising from 30 to 70 percent by weight of the combined weight of said normalbutyl and isobutyl esters present in the composition.

Trade Mark Applications

Afro, in capitals, for fertilizer. Filed Feb. 10, 1955 by American Cyanamid Co., New York, N. Y. Claims use since Dec. 1, 1953.

Multi-Super, in block capitals, for phosphatic fertilizer or phosphatic ingredient for mixed fertilizers. Filed Feb. 10, 1955 by International Minerals & Chemicals Corp., Chicago. Claims use since Jan. 22, 1955.

Sgm, in heavy script capitals, for chemical fertilizer. Filed Feb. 14, 1955 by Sherritt Gordon Mines, Toronto, Canada. Claims use since May 15, 1954.

Sherritt, in heavy capitals, for chemical fertilizers. Filed Feb. 14, 1955 by Sherritt Gordon Mines, Toronto, Canada. Claims use since May 15, 1954.

Dap, in large capitals, for fertilizing compound. Filed Feb. 15, 1955 by The Colorado Fuel and Iron Corp., Denver, Colo. Claims use since Jan. 10, 1955.

Planter Magic, in slanting script capitals from left to right, for growing mix or fertilizer. Filed Mar. 3, 1955 by Ho-Pet-Inc., d. b. a. Idaho Peat Co., Los Angeles. Claims use since Aug. 15, 1954.

K-flo, in slanted script capital and lower case from left to right, for liquid solution of potash for use as ferilizer. Filed Jan 31, 1955 by Flo-Mix Fer- since Jan. 28, 1954.

Phos-Flo, in slanted script capital and lower case, for fertilizer. Filed Jan. 31, 1955 by Flo-Mix Fertilizers, Inc., Houma, La. Claims use since Jan. 28, 1954.

Nitro Green, in script, for liquid fertilizer. Filed Feb. 14, 1955 by Agro-Vita, Inc., d. b. a. Liquid Fertilizer Co., Minneapolis, Minn. Claims use since June 1954.

Fertil-King, in script, for liquid fertilizer. Filed Feb. 24, 1955 by Agro-Vita, Inc., d. b. a. Liquid Fertilizer Co., Minneapolis, Minn. Claims use since Feb. 1, 1955.

Liquidry, in heavy capitals, for fertilizers. Filed Oct. 25, 1954 by Port Fertilizer & Chemical Co., Los Fresnos, Tex. Claims use since Mar. 1, 1954.

Duraset, in heavy capitals, for controlling the setting of flowers or fruit. Filed Dec. 9, 1954, by United States Rubber Co., New York. Claims use since Nov. 24, 1954.

Mosonex, in capitals with "e" in lower case attached to "x," for plant growth aid. Filed Dec. 23, 1954 by Hydroponic Chemical Co., Inc., Copley, Ohio. Claims use since Dec. 9, 1954.

Fertosan, in script letters slanting upward, for organic products. Filed April 22, 1955, by Fertosan Limited, Wolverhampton, England. Claims use since August 1, 1943.

Phyromycin, in bold-faced letters, for Antibiotic Preparation of agricultural use. Filed March 18, 1955 by Olin Mathieson Chemical Corp., New York. Claims use since December 14, 1954.

HIGH-K

MURIATE OF POTASH for the PLANT FOOD INDUSTRY

This symbol stands for high-grade coarse and uniform Muriate of Potash (60% K_2O minimum). Southwest Potash Corporation provides a dependable supply of HIGH-K* Muriate for the plant food industry.

*Trade Mark

Southwest Potash Corporation

61 BROADWAY ★ NEW YORK 6, N. Y.

"Loaded, dragged, handled rough—

burlap bags take a terrific beating," says Fred W. Schroer of Valdosta, Georgia. "We buy about 480 tons of fertilizer a year in burlap bags we don't have to coddle. They can absorb moisture if a sudden rain comes up, and good air circulation cuts down mold.

"We wash the bags right away and use them for everything on the farm. In our hopper for grain we can bag with burlap in record time. We ship seeds all over the country in burlap bags and know they'll reach their destination in good condition."

You can sell more fertilizer when you pack in burlap bags because they make the farmer's work easier and they have *so many uses* around the farm.

Just ask your own customers—

they'll tell you that burlap

Is strong — takes dragging, dropping, *man-handling* — any tough job on the farm.

Gives good ventilation — keeps farm supplies and products fresh.

Laughs at sudden showers — wetness or dampness can't weaken it.

Saves money — extra value from re-sale and re-use.

Saves storage space — stacks to any height without slipping.

1000 USES

Has 1000 uses — always in demand on the farm (popular with farm wives, too!)

THE BURLAP COUNCIL

of the Indian Jute Mills Association

155 East 44th Street, New York 17, N. Y.

Zeolex 7

Why more formulators are using Zeolex 7*

—the sorptive carrier specifically designed for pesticides

DDT—With 75% wettable DDT (for WHO and ICA requirements) prolonged tests show:

- no phytotoxicity
- non-caking
- stability (confirmed by bio-assay)
- excellent suspension

Toxaphene—Zeolex 7 is recommended for a 60% toxaphene concentrate and as a carrier or bulking agent in regular concentrations.

Other Pesticides—Initial evaluation shows that Zeolex 7 is safe to use in almost all pesticides—that it does *a better job at lower cost* than other similar materials. In combination with other low-cost less sorptive carriers, Zeolex 7 provides a wide range of sorptive capacity to meet the requirements of the pesticide industry. Write for your working sample today.

**an ultra-fine sodium silico aluminate*

PHYSICAL PROPERTIES:

Oil Absorption	155-160 cc/100 grams
Particle Size	0.01-0.05 microns
pH (10% slurry)	7 (approx.)
Screen Residue	0.1% maximum on 325 mesh screen
Moisture (105° C)	less than 2%
Form	Fine white powder
Bulk Density	Aerated—3 lbs/cu. ft. As packed—20 lbs/cu. ft. 50-lb. moisture barrier bags

HUBER

J. M. HUBER CORPORATION • *100 Park Avenue, New York 17, N. Y.*

Manufacturers of Clays and Pigments for the Insecticide Industry

BARDEN • BARDEN AG • SUPREX • SUPREX LG • ZEOLEX 7

DIAMOND dependable performance pays off here

DIAMOND Research Center, Painesville, Ohio

. . . because we make sure of it here

Today, and every day, the search for new and improved agricultural chemicals is going forward in DIAMOND's research center. At plant laboratories, constant check is maintained on quality and potency. Here are just TWO important reasons why DIAMOND technicals and ready-to-use formulations continue to grow in popularity. Our technical staff will be glad to work with you on special problems. For information, write DIAMOND ALKALI COMPANY, Chlorinated Products Division, 300 Union Commerce Building, Cleveland 14, Ohio.

DIAMOND INSECTICIDES AND HERBICIDES

- For Wheat—Butyl ester of 2, 4-D—Grain Fumigants —Hexachlorobenzene (smut control)
- DDT
- BHC
- LINDANE
- MITICIDE K-101 (Ovex)
- 2, 4-D Weed Killers
- 2,4,5-T Brush Killers
- Wettable powders, dust concentrates, emulsifiable concentrates and oil solutions based on our technical grade chemicals.

DIAMOND ALKALI CHEMICALS ®

Diamond Chemicals

2,739,885. METHODS OF PRODUCING PHOSPHATIC FERTILIZERS. Patent issued March 27, 1956 to Leroy Henry Facer, Phelps, N. Y., assignor, by mesne assignments, to Glen E. Cooley, Schenectady, N. Y., Warren Dunham Foster, Ridgewood, N. J., Halfadan Gregersen, N. Y., Magnus I. Gregersen, Englewood, N. J., and Dana S. Lamb, New York, N. Y., trustees. A process of manufacturing a pelleted superphosphatic fertilizer which comprises dividing ground phosphate rock into two portions one containing coarse particles and the other containing fine particles, mixing said coarse particles with sufficient sulphuric acid to acidulate all of said ground phosphate rock, adding to the over-acidulated sludge so formed all but a minor fraction of the remainder of said rock containing fine particles and agitating the mass so formed, promptly thereafter pelleting said mass while it is still chemically active, and adding thereto during a late stage of the pelleting operation the said minor fraction of said finely divided rock as a coating material which is thereby bonded to the body of the pellet and becomes palpably dry and thereafter maintains the integrity of the pellet.

2,739,886. PROCESSES FOR PRODUCING FERTILIZERS AND THE PRODUCTS THEREOF. Patent issued March 27, 1956 to Leroy Henry Facer, Phelps, N. Y., assignor, by mesne assignments, to Glen E. Cooley, Schenectady, N. Y., Warren Dunham Foster, Ridgewood, N. J., Halfdan Gregersen, New York, Magnus I. Gregersen, Englewood, N. J., and Dana S. Lamb, New York trustees. A process of manufacturing pelleted superphosphate which comprises mixing phosphate rock and an inorganic acid, after the mixture has set and while it is still moist and warm from the mixing operation and chemically active but before it has cured, forming it into pellets, and coating the pellets so formed while still moist from said mixing operation with a dry absorptive material, said coating alone being effective to preserve the identity of the pellets thereafter.

2,740,115. METHODS OF PRODUCING TRIPLE SUPERPHOSPHATE. Patent issued March 27, 1956 to Leroy Henry Facer, Phelps, N. Y., assignor, by mesne assignments, to Glen E. Cooley, Schenectady, N. Y., Warren Dunham Foster, Ridgewood, N. J. Halfdan Gregersen, New York, Magnus I. Gregersen, Englewood, N. J., and Dana S. Lamb, New York, trustees. A process of manufacturing triple superphosphate in particulate form which comprises: dividing a predetermined quantity of ground phosphate rock into a selected major and a minor portion; mixing and reacting a predetermined quantity of concentrated phosphoric acid with said selected major portion of the said ground phosphate rock, the predetermined amount of concentrated phosphoric acid being the amount sufficient to react with all of the said predetermined quantity of ground phosphate rock and in excess of the amount sufficient to react with said selected major portion of said ground phosphate rock, and the concentration of the said phosphoric acid being sufficiently high to limit and control the amount of water present to that required by complete reaction of the entire predetermined quantity of ground phosphate rock and the entire predetermined quantity of phosphoric acid, and to furnish water of crystallization of the triple superphosphate produced after loss of water evaporated; grating the mass formed by said mixing by the natural heat of reaction; disinteand reaction of said phosphoric acid and said selected major portion of said rock to form disintegrated small particles which are chemically active and over-acidulated; subjecting said disintegrated small particles to movement to form coalesced larger particles of desired size; and thereafter adding the said minor portion of said predetermined quantity of ground phosphate rock to coat the said coalesced larger particles, thereby reacting said minor portion of said ground rock with the said excess quantity of phosphoric acid to form coalesced particulate triple superphosphate.

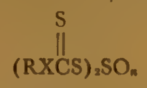
2,740,116. METHOD OF PRODUCING PHOSPHORIC PRODUCTS. Patent issued March 27, 1956 to Leroy H. Facer, Phelps Township, Ontario County, N. Y., assignor, by mesne assignments, to Glen E. Cooley, Schenectady, N. Y., Warren Dunham Foster, Ridgewood, N. J., Halfdan Gregersen, New York, Magnus I. Gregersen, Englewood, N. J., and Dana S. Lamb, New York, trustees. A process of manufacturing particulate superphosphatic fertilizer which comprises: grinding a predetermined quantity of phosphate rock; dividing said ground rock into a major and a minor portion; mixing concentrated sulphuric acid and dilute phosphoric acid of desired concentrations to form a combined acid; mixing and reacting a predetermined quantity of said combined acid with said major portion of the said phosphate rock, the predetermined amount of combined acid being the amount sufficient to react with all of the said predetermined quantity of ground phosphate rock, and in excess of the amount sufficient to react with said major portion of said phosphate rock, and the concentration of the said combined acid being sufficiently high to limit and control the amount of water present to that required by complete reacion of the entire predetermined quantity of ground phosphate rock and the entire predetermined quantity of said combined acid and to furnish water of crystallization of the superphosphatic fertilizer produced after loss of water evaporated by the natural heat of reaction; disintegrating the mass formed by said mixing and reaction of said combined acid and said major portion of said rock to form disintegrated small particles which are chemically active and over-acidulated; subjecting said disintegrated small particles to movement to form coalesced larger particles of desired size; and thereafter adding the said minor portion of said ground phosphate rock to coat the said coalesced larger particles, thereby reacting said minor portion of the said ground rock with the said excess quantity of combined acid to form substantially dry, coalesced particulate superphosphatic fertilizer.

2,741,551. METHOD OF PREPARING A SOIL CONDITIONING AND ENRICHING COMPOSITION. Patent issued April 10, 1956 to Gordon A. Daline, Excelsiro, Minn.

Method of preparing an agglomerative fertilizing soil-conditioning composition which is adapted for package transportation and substantially uniform soil distribution which consists in first intimately admixing pulverized, hydrolyzed polyacrylonitrile with a pulverized, dry, organic water-soluble adhesive to a point where said polyacrylonitrile is substantially encysted with said adhesive and thereafter admixing said first mixture with a relatively large quantity of granular, dry soy bean meal and simultaneously with said admixing, applying a restricted quantity of finely sprayed moisture during admixture to the particles to form substantial agglomerates which include said polyacrylonitrile and said soy bean meal particles.

2,743,209. XANTHYL AND TRITHIOCARBONYL, SULFIDES, SULFOXIDES, AND SULFONES AS PESTICIDES. Patent issued April 24, 1956 to Robert H. Jones, Irvington, and Silvio L. Giolito, New York, N.Y.

The method of killing pests comprising applying to a pest habitat as the sole pesticidal agent a compound having the formula:

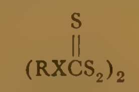


$$(RX\overset{\overset{S}{\|}}{C}S)_2SO_n$$

wherein n is a member from 0 to 2, X is chosen from the group consisting of oxygen and sulfur, and R is a member chosen from the group consisting of saturated aliphatic radicals from 1 to 18 carbon atoms, cycloparaffin radicals, aryl radicals, and aralkyl radicals.

2,743,210. XANTHOGEN AND DITHIOCARBONYL TETRASULFIDES AS PESTICIDES. Patent issued April 24, 1956 to Robert H. Jones, Irvington, and Silvio L. Giolito, New York, assignors to Stauffer Chemical Co., a corporation of Delaware.

The method of killing pests comprising applying to a pest habitat as the sole pesticidal agent a compound having the formula



$$(RX\overset{\overset{S}{\|}}{C}S_2)_2$$

wherein X is a member selected from the group consisting of oxygen and sulfur and R is a member chosen from the group consisting of aliphatic radicals of from 1 to 18 carbon atoms, cycloparaffin radicals, aryl radicals and aralkyl radicals.

2,743,211. Rhodanines. Patent issued April 24, 1956 to Joseph T. Bashour, New York, assignor to Stauffer Chemical Co., a corporation of Delaware.

As a new composition of matter, a composition selected from the group consisting of 3-(p-chlorophenyl)-5-methyl rhodanine, and 3-(p-chlorophenyl)-5-ethyl rhodanine.

African Pyrethrum

It's a fact Insects are not resistant to Pyrethrum

PYRETHRUM, harmless to human and animal life, is

Unsurpassed in Quick Knock-Down

Economy in Concentration With Synergists

Rapid Dispersal High Penetration

PYRETHRUM offers highest protection for

- Tobacco Storage
- Home Aerosols and Sprays
- Poultry Houses
- Food-Meat Packers
- Ship's Holds
- Granaries and Flour Mills

TO: AFRICAN PYRETHRUM DEVELOPMENT, INC. 1
65 Pine Street, New York 5, N.Y.

Please send me__copies of free booklet, Pyrethrum Facts.

NAME____________________

NO. ST.____________________

CITY__________ STATE________

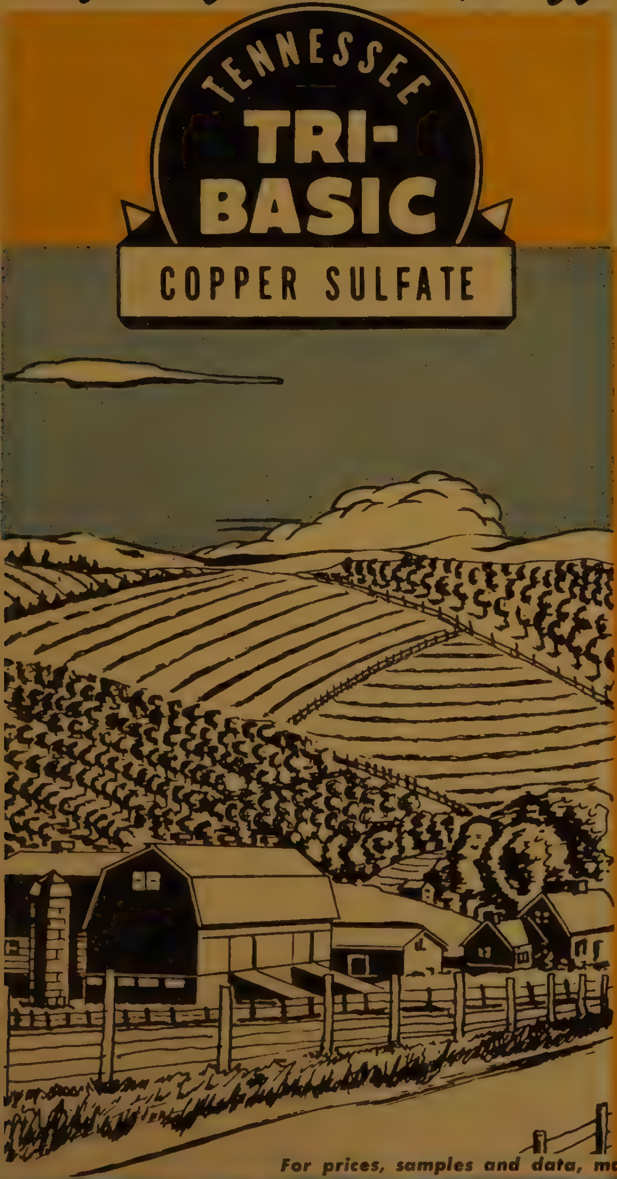
PYR
AFRICAN PYRETHRUM

DUST MIXERS—FORMULATORS—CUSTOM SPRAYERS—GROWERS

TENNESSEE CORPORATION

From mining through research and chemical processing to profitable farming.

Why do disease control schedules call for finishing off with Copper?



Because research, and the experience of successful growers shows that copper fungicides are the best disease protection and insurance available with which to send their crops to market or storage.

Check These Money Making FACTS:

- ✓ Increased yields of number one quality. The type increase that produces greater profits.
- ✓ Improved storage and keeping qualities. It is the yield of number one's out of storage that pays dividends.
- ✓ Improved eating and flavor properties. Don't jeopardize your future and most important—the consumer—through the sale of "flat," watery produce.
- ✓ Economical to use. Compare the overall cost of TRI-BASIC against the organics.
- ✓ Easy to apply. Spray or dust. Compatible with other pesticides.
- ✓ No residue tolerance restrictions. Use as recommended. Insure against seizure or condemnation.

**FOR THE BEST IN COPPER
GET TENNESSEE TRI-BASIC
COPPER SULPHATE**

For prices, samples and data, make request on your firm's letterhead.

TENNESSEE CORPORATION

617-29 Grant Building, Atlanta, Georgia

5 PHILLIPS Fertilizer Materials for High Analysis Mixtures

1 Ammonium Sulfate

New Premium Quality Phillips *66* Ammonium Sulfate contains 21% nitrogen, 23.8% sulfur. It is *dry*-cured to remove excess moisture, prevent caking. Uniform dust-free crystals flow freely, mix easily. Ideal for all analyses of mixed goods and for direct application. Available in bags or bulk.

2 Anhydrous Ammonia

Phillips *66* Agricultural Ammonia contains 82% nitrogen. It's a convenient, economical source of nitrogen for mixed goods formulation. Tank car shipments are assured to Phillips contract customers by Phillips huge production facilities in the Texas Panhandle and at Houston, Texas.

3 Nitrogen Solutions

Get more N per dollar! There are three Phillips *66* Nitrogen Solutions for use in preparation of high-analysis fertilizers and the ammoniation of superphosphate. These solutions keep manufacturing costs low; help rapid, thorough curing.

4 Ammonium Nitrate

Phillips *66* Prilled Ammonium Nitrate contains 33.5% nitrogen. The small, coated prills resist caking, handle easily. Depend on Phillips *66* Prilled Ammonium Nitrate for free-flowing uniform properties and top-notch crop response as a direct application material. It's an ideal companion high nitrogen fertilizer for quality mixed goods.

5 Triple Superphosphate

Phillips *66* Triple Superphosphate contains 46% available phosphoric acid. Ideal for use in formulation of high-analysis fertilizers.

PHILLIPS CHEMICAL COMPANY
A Subsidiary of Phillips Petroleum Company, Bartlesville, Oklahoma

Phillips 66

ATLANTA, GA.—*1428 West Peachtree Street*
AMARILLO, TEX.—*First Nat'l Bank Bldg.*
BARTLESVILLE, OKLA.—*Adams Bldg.*
CHICAGO, ILL.—*7 South Dearborn St.*
DENVER, COLO.—*1375 Kearney Ave.*
DES MOINES, IOWA—*606 Hubbell Bldg.*
HOUSTON, TEX.—*1020 E. Holcombe Blvd.*
INDIANAPOLIS, IND.—*1112 N. Pennsylvania St.*
KANSAS CITY, MO.—*500 West 39th St.*
MINNEAPOLIS, MINN.—*212 Sixth St. South*

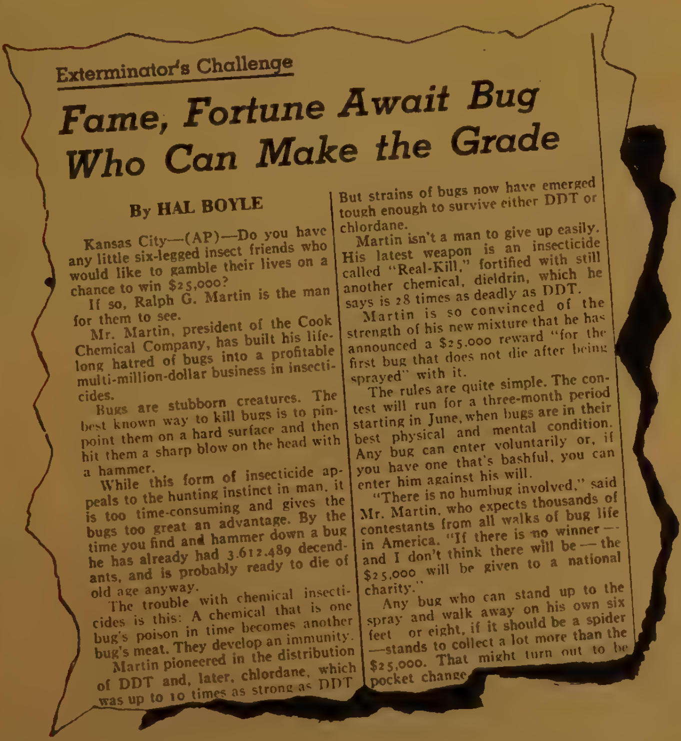
NEW YORK, N.Y.—*80 Broadway*
OMAHA, NEB.—*WOW Building*
PASADENA, CALIF.—*330 Security Bldg.*
RALEIGH, N. C.—*804 St. Mary's St.*
SALT LAKE CITY, UTAH—*68 South Main St.*
SPOKANE, WASH.—*521 E. Sprague*
ST. LOUIS, MO.—*4251 Lindell Blvd.*
TAMPA, FLA.—*3737 Neptune St.*
TULSA, OKLA.—*1708 Utica Square*
WICHITA, KAN.—*501 KFH Building*

$25,000

backs the switch to

SULFOXIDE

BR-135 and Dieldrin in new improved insecticide formula!



Exterminator's Challenge

Fame, Fortune Await Bug Who Can Make the Grade

By **HAL BOYLE**

Kansas City—(AP)—Do you have any little six-legged insect friends who would like to gamble their lives on a chance to win $25,000?

If so, Ralph G. Martin is the man for them to see.

Mr. Martin, president of the Cook Chemical Company, has built his lifelong hatred of bugs into a profitable multi-million-dollar business in insecticides.

Bugs are stubborn creatures. The best known way to kill bugs is to pinpoint them on a hard surface and then hit them a sharp blow on the head with a hammer.

While this form of insecticide appeals to the hunting instinct in man, it is too time-consuming and gives the bugs too great an advantage. By the time you find and hammer down a bug he has already had 3.612.489 decendants, and is probably ready to die of old age anyway.

The trouble with chemical insecticides is this: A chemical that is one bug's poison in time becomes another bug's meat. They develop an immunity.

Martin pioneered in the distribution of DDT and, later, chlordane, which was up to 10 times as strong as DDT But strains of bugs now have emerged tough enough to survive either DDT or chlordane.

Martin isn't a man to give up easily. His latest weapon is an insecticide called "Real-Kill," fortified with still another chemical, dieldrin, which he says is 28 times as deadly as DDT.

Martin is so convinced of the strength of his new mixture that he has announced a $25.000 reward "for the first bug that does not die after being sprayed" with it.

The rules are quite simple. The contest will run for a three-month period starting in June, when bugs are in their best physical and mental condition. Any bug can enter voluntarily or, if you have one that's bashful, you can enter him against his will.

"There is no humbug involved," said Mr. Martin, who expects thousands of contestants from all walks of bug life in America. "If there is no winner — and I don't think there will be — the $25,000 will be given to a national charity."

Any bug who can stand up to the spray and walk away on his own six feet or eight, if it should be a spider —stands to collect a lot more than the $25,000. That might turn out to be pocket change.

This news story dramatically emphasizes the faith of Cook Chemical Company in its new formulation of "Real Kill"—containing Sulfoxide.

Sulfoxide — product of S. B. Penick and Company — is an outstanding effective synergist . . . safe . . . non-irritating . . . with a mild, pleasant odor.

For technical information and suggested starting formulas for popular insecticidal sprays, send for your copy of our 12-page bulletin, SULFOXIDE.

PENICK

S. B. PENICK & COMPANY 50 CHURCH ST., NEW YORK 8 · 735 W. DIVISION ST., CHICAGO 10

TRIPLE SUPER-PHOSPHATE

TC
TENNESSEE CORPORATION

"Maximum" means more in ammoniation when you choose U.S. Phosphoric Products as your source for Triple Superphosphate. It means more, too, in terms of service—the kind of prompt, dependable deliveries on which you can base your production—as it has meant for 30 years.

Call in your Bradley & Baker representative to help you plan your shipments of superior quality U.S. Phosphoric Products Triple Superphosphate in whatever grade you require.

U.S. PHOSPHORIC PRODUCTS
Division
TENNESSEE
CORPORATION
Tampa, Florida

Sales agents: **BRADLEY & BAKER** • 155 EAST 44th STREET • NEW YORK 17, N. Y.

District Sales Offices:

ATLANTA, GA. · INDIANAPOLIS, IND. · ST. LOUIS, MO.
NORFOLK, VA. · HOUSTON, TEX.

WASHINGTON *Report*

by

Donald G. Lerch

Cornwell, Inc., Washington, D. C.
(Agricultural Chemicals Washington Correspondent)

WANTED — more pesticide salesmen! With the National Agricultural Chemicals Association convention sparking new fires behind industry sales and merchandising problems, it might be well to analyze the news reports being fed out of Washington. Time after time this reporter has seen news releases issued by the government which do not give adequate credit to the important role pesticides play in increasing farm production.

Since the U. S. Department of Agriculture in Washington is probably the greatest single source of farm news throughout the nation, the dearth of pesticide reports might be important. Farm magazines, farm radio and television, and columnists for farm newspapers all rely upon news from the U. S. Department of Agriculture as source material. While most capable writers do not use it verbatim, nonetheless all are influenced by the material issued.

One of the latest reports from the Department of Agriculture emphasizes the changes in farm practices in recent years that have increased efficiency of production. The report compares current farm operations with those of two decades ago. The following factors are credited with increasing efficiency as per the official Department press release: "Larger farms, increased mechanization, greater use of new crop varieties and commercial fertilizers, and shifts in production.

"Increased use of commercial fertilizers has greately upped crop yields. In the Corn Belt for example the cashgrain farmer has spent an average of $780 on fertilizer and lime in 1955. In 1937-'41 he was spending about $60 per farm."

Certainly fertilizers are of utmost importance in increasing the efficiency of production. Those in the fertilizer industry, including the National Plant Food Institute, are to be congratulated on their sound and apparently effective education program. But surely there is an abundance of evidence that the use of pest control chemicals, too, yields substantial increases in the efficiency of agricultural production. In some cases without the use of pest control chemicals there can be no crops of marketable quality.

The pesticide industry has prepared and delivered in Washington thousands of pages of eloquent testimony documenting the need for pest control chemicals and their effectiveness. This testimony was given during the hearings held by the Food and Drug Administration and in testimony before Congress. Somehow it seems to have escaped the hands of those who are charged with the responsibility for issuing government releases and conducting government educational programs.

In the opinion of some, one of the reasons for the weakness in the reporting on pesticide developments in a positive fashion is the reorganization of the U. S. Department of Agriculture a year or two ago, in the course of which some of the top pesticide writers were put in jobs where they don't have a chance to turn out copy that sells the value of pesticides.

Washington is usually very sensitive to the requests put upon it. Perhaps it would be well for a committee to be appointed to review the whole matter of information on pest control chemicals. It would seem that the initiative for such a move might well come from some of the leading companies in the field and perhaps later from NACA. Certainly there is everything to be gained by taking such a move now.

* * * * *

Congratulations appear in order to the National Plant Food Institute for its cooperative program with Iowa bankers and Wisconsin agricultural leaders. In Iowa the Bankers' Association in cooperation with the Iowa State College and the National Plant Food Institute is distributing 40,000 copies of a 4-page folder emphasizing the importance of soil testing. In addition 5,000 copies of the folders are being supplied to agricultural workers by Iowa State College, according to Russell Coleman, executive vice president of NPFI.

This program has several advantages, for not only does it get sound educational material into the hands of farmers, but some of it is bound to rub off on bankers and agricultural leaders. Both of these groups have a key role in financing the use of fertilizer and encouraging its use in general.

Actual production figures on the advantages of following the University of Wisconsin fertilizer recommendations are pictured in the 4-page leaflet being distributed throughout the state.

Leaflets such as these, along with the many educational programs of the National Plant Food Institute, its member companies, and government agencies are teaming to keep fertilizers upper-most in the minds of farmers. What's more, the use of fertilizers of higher nutrient content continues to increase. This long-term trend toward higher analysis fertilizer marks the 16th consecutive year for the increased use of primary plant nutrients.

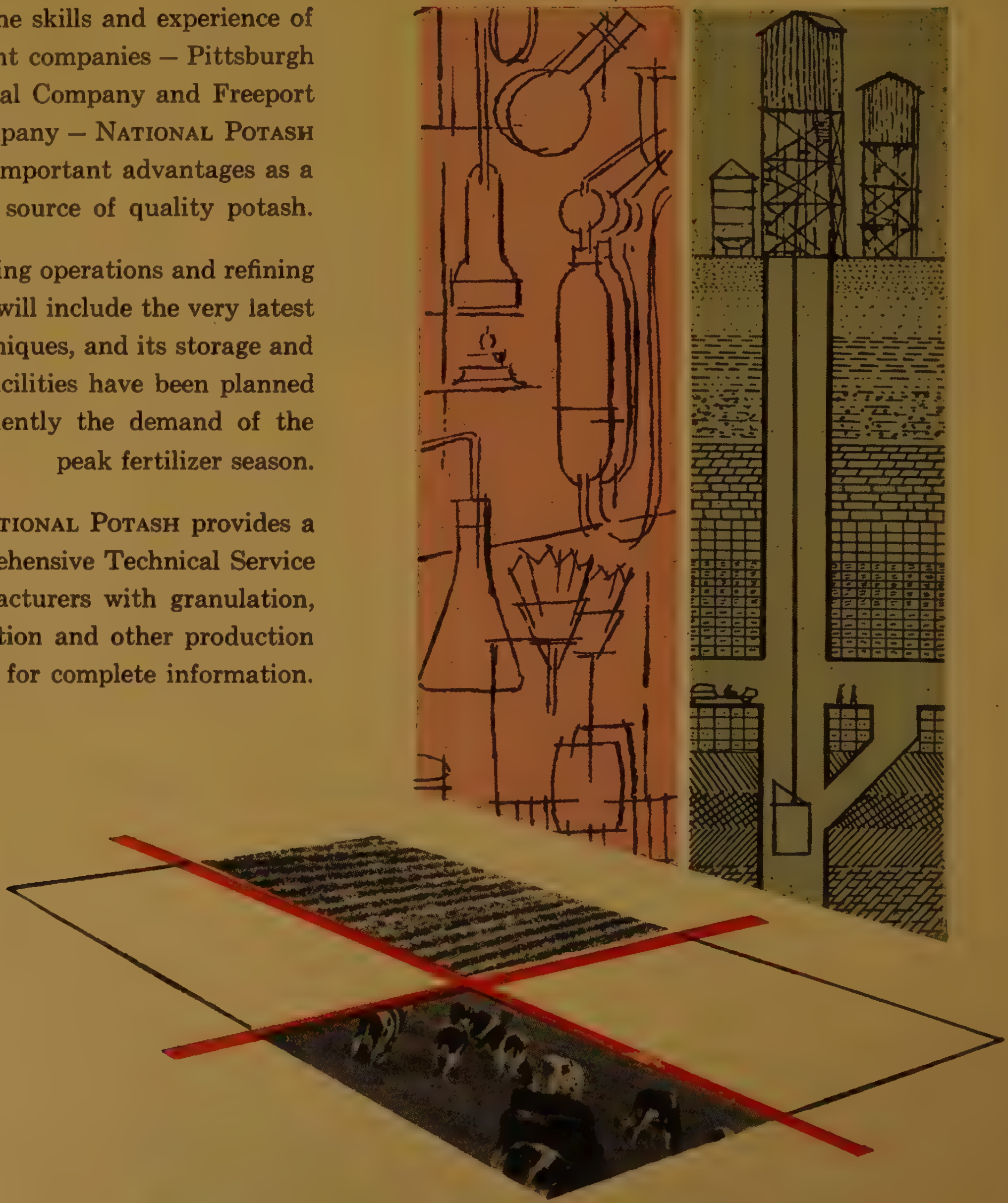
According to the U. S. Department of Agriculture, consumption of primary nutrients increased 3.8 percent during the past year over con-

LOOK TO
NATIONAL
POTASH
FOR QUALITY
AND SERVICE

Backed by the skills and experience of its parent companies — Pittsburgh Consolidation Coal Company and Freeport Sulphur Company — NATIONAL POTASH offers important advantages as a dependable source of quality potash.

NATIONAL'S mining operations and refining processes will include the very latest industry techniques, and its storage and shipping facilities have been planned to meet efficiently the demand of the peak fertilizer season.

In addition, NATIONAL POTASH provides a free, comprehensive Technical Service to help manufacturers with granulation, formulation and other production problems. Write for complete information.



NATIONAL
POTASH COMPANY
205 EAST 42nd ST. • NEW YORK 17, N.Y.

sumption the previous year. Nitrogen increased 6.1 percent, phosphoric oxide 2.2 percent, and potash 3.4 percent.

It's significant to note that the increased use of primary plant nutrients occurred in the face of a decrease in the total tonnage of fertilizer used. The consumption of all fertilizers in the year ending June 30, 1955, the latest for which this data is available, was 99.8 percent of the consumption in the previous year.

The South Atlantic region still leads in the total fertilizer tonnage used. However the East-Northcentral region, with less total tonnage, leads in the consumption of primary nutrients.

* * * * *

Twenty-five thousand traps are in operation in Florida to spot infestations of the Mediterranean fruit fly. While a few new isolated infestations continue showing up, officials would be very surprised to find another major outbreak. The operating procedure now is to make two applications of malathion in cases of isolated fly catches, and then keep the area under surveillance. If more flies are caught, sprays are continued. Spraying operations cease when two applications have been made and no more flies are trapped in that particular area.

The overworked phrase "cautious optimism" really applies to the way most officials here view the progress of the Mediterranean fruit fly campaign. They were given quite a jolt when a big West Coast infestation was detected in the Ft. Myers-St. Petersburg area. However, now they feel they have the fly on the run.

Florida's five million added to an equal amount from the Federal Government gives enough to stamp all bills "PAID," at least for the time being. While the last outbreak of the fruit fly cost seven and a half million to eradicate, the control program was different, and then, of course, the dollar of 30 odd years ago looked quite a bit different than the one today. Dr. W. L. Popham, director, Crops Regulatory Programs, U. S. Department of Agriculture, feels that the time is about at hand when an appraisal can be made of just when the fly will be eradicated. Even now roadblocks may be reduced in number and some of the other more irritating phases of the eradication campaign lessened.

At this moment it looks as though a major victory may be shaping up in man's battle against this particular pest.

* * * * *

With imported bugs causing trouble all over the country — the Mediterranean fruit fly in Florida, the spotted alfalfa aphid in many parts of the West, plus the Khapra beetle, as well as other pests—the U. S. Department of Agriculture has felt it is advisable to tell the public about their inspection service. Logically, questions are being raised about the effectiveness of our protective network operated by the government to keep foreign pests out of this country.

Possibly to head off a storm, the Department says now the Plant Quarantine Inspectors have intercepted 17,500 lots of destructive pests, 11,600 insects, and 5,900 diseases from throughout the world during this past year. During the same time they examined over 54,000 vessels, 101,000 airplanes, as well as 17 million motor vehicles, and 101,00 freight cars, plus 2,200 pullmans and coaches arriving from Mexico. And even with all this, pests causing millions of dollars of damage have entered the country within the past few years. This would seem to raise the question of what to do. Is it a matter of appropriating more money to increase the number of inspectors, or as the volume of foreign trade and foreign passenger travel increases, are we confronted with the specter of inevitably playing host to an increasing number of highly destructive insects and diseases in the years ahead? This is one for the experts to answer, and even among them there are probably wide differences of opinion.

Existing facts seem to indicate that the present system is not working sufficiently well to give us the kind of protection most taxpayers probably feel they are entitled to. This is a matter which might well be aired by Congress when it returns next year.

* * * * *

You can get your copy of the new U. S. Department of Agriculture Yearbook titled "Animal Diseases" by sending two dollars to the Superintendent of Documents, Government Printing Office, Wash., D.C.

The new 1956 Yearbook contains 134 chapters by leading veterinarians and other scientists, most of them in the Department of Agriculture and State Colleges. Diseases and parasites of cattle, swine, sheep, goats, poultry, dogs, cats, horses, mules, rabbits, minks, foxes, and other animals are emphasized. Also the causes, symptoms, treatment management, and modes of transmission are described in detail. There are also introductory chapters on food supplies and animals diseases, infectious diseases, common to animals and man, causes of diseases, genetics and disease, protection against transmissionable diseases and parasites, veterinary biological products, anti-biotics, the sulfa drugs, and other drugs. Animal health is a growing problem in the country, and the Yearbook is published in recognition of this fact.

There's quite a bit of interest in the new 318 acre tract of farm land just east of Ames, Iowa, that's been selected as the site of the new Federal Livestock and Poultry Disease Laboratory. Congress appropriated sixteen and a quarter million dollars for the construction of the Laboratory.

* * * * *

What started as a crash program to aid Iran to beat back the worst plague of locusts in 80 years has turned out to be a world-wide program of pest control development which could well pay dividends to the United States, not only in terms of good will, but in terms of good solid business.

Spearheading an important part of this work is Edson J. Hambleton,

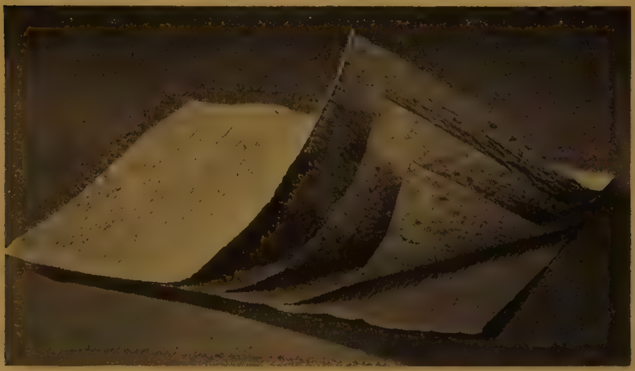
(*Continued on Page* 135)

How Fulton's Ful-Flex Elastic Multiwall paper bags save money by replacing costly rigid containers—even when shifting and caking are problems.

BY: *J. F. Ryan, Manager*
Multiwall Department, Bag Division
Fulton Bag & Cotton Mills
St. Louis, Missouri

1. In storage and shipment of many chemicals, caking and shifting have led to the adoption of rigid containers which are costly. And the extra weight adds extra dollars to shipping costs.

2. Many firms have turned to Fulton's Ful-Flex® Elastic Multiwall Bags for a cost-cutting answer. These bags are light-weight, strong, and resistant to caking and shifting. Why? A closeup shows you.



3. Kraft paper is crinkled to provide firm support, giving only under unusual stresses — just enough to prevent breakage. The grip provided by this surface also prevents slipping in storage and shipping.

4. **FREE!** Special posters for use in plants feature easy-to-understand "Do's and Dont's" on the handling of multiwall bags. An exclusive free service to Fulton customers.

WRITE US TODAY

Special Services Division
General Office
Fulton Bag & Cotton Mills
1408 Annunciation St.
New Orleans, La.

We have a problem in packing____________________

(Please feel free to write Fulton full details in complete confidence)

Name____________________

Company____________________

Address____________________

City________________ State________

Let us investigate whether Fulton can solve a problem for you.

Fulton
BAG & COTTON MILLS

ATLANTA • CHICAGO • DALLAS • DENVER • KANSAS CITY
LOS ANGELES • MINNEAPOLIS • NEW ORLEANS • NEW YORK
OKLAHOMA CITY • PHOENIX • ST. LOUIS • SAN FRANCISCO
SAVANNAH • WINTER HAVEN

LISTENING *Post*

Seed Treatments to Protect Corn Seerlings Against Stewart's Wilt

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Epidemics and Identification Section, Horticultural Crops Research Branch, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

SAUL RICH, of the Connecticut Agricultural Experiment Station, writes that very early attack by Stewart's wilt (*Bacterium stewartii* E. F. Sm.) can destroy whole fields of corn seedlings. Efficient protection through the very early stages would allow the plants to make a crop even though later they became diseased. Seed treatments to make the emerging seedlings resistant to wilt would be cheap and easy to use, and would provide protection when it is needed most. Any promising materials could be tried also, as foliage sprays after the seedlings had begun to grow.

The materials tested for this purpose included antibiotics, growth regulators, and compounds that had shown chemotherapeutic activity in other studies. The antibiotics tried were penicillin, streptomycin, and terramycin. The growth regulators were maleic hydrazide; indoleacetic acid; 2,4-D; N-phenyl isopropylcarbamate (IPC); N-(3-chlorophenyl) isopropylcarbamate (chloro IPC); B-naphthoxyacetic acid; naphthaleneacetic acid; sodium 2,4-dichlorophenoxyethyl sulfate (Crag 1); pentachlorophenoxyacetic acid; 2,4,6-trichlorophenoxyacetic acid (2,4,6-T); and pentachloroisobutyric acid. Certain of these growth-regulators have already been shown to make plants resistant to disease. The miscellaneous materials chosen had previously been demonstrated by other workers to act as chemotherapeutants against other diseases. These were glucose, benzoic acid, and salicylic acid. Isonicotinic acid hydrazide was included as a possible bactericide. Captan was tried also.

Twenty-five seeds of North Star sweet corn were used for each treatment. The seeds were soaked overnight in 25 cc of a dilution of test material. Water soluble materials were dissolved directly in water, while the less soluble compounds were dissolved first in 1 ml of acetone before being taken up in water. After the seeds had soaked overnight, they were blotted and then planted immediately in plant bands filled with soil, 5 seeds per band. Control seeds were soaked in water overnight before planting. The plant bands, arranged in a 21 x 5 Youden square, were kept in the greenhouse at 80°F. When the seedlings showed two true leaves, they were inoculated by hypodermic syringe with a 72-hour broth culture of *Bacterium stewartii*. Leaf symptoms were read about a month after inoculation. Five disease grades were used: 0 = no disease, 1 = slight spotting,

TABLE 1.

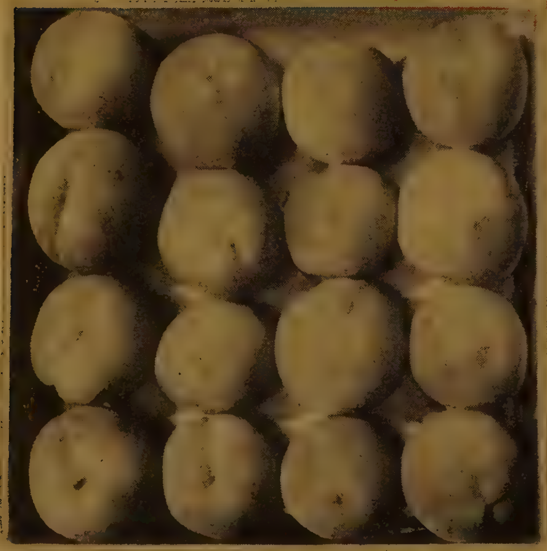
Incidence of Stewart's wilt in corn seedlings growing from seeds soaked in various antibiotics, growth regulators or chemotherapeutants

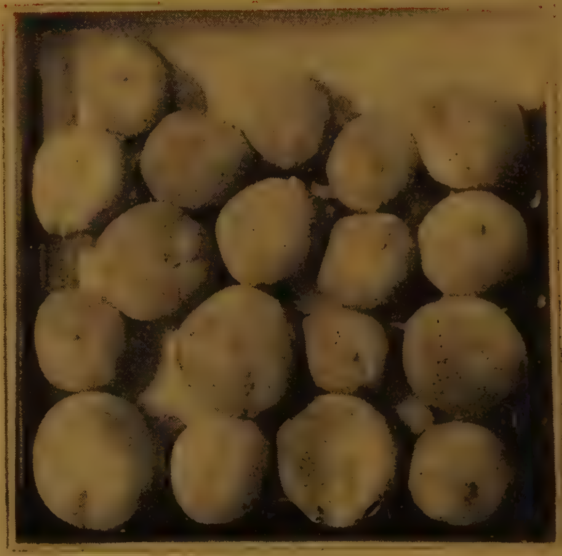
Material	Conc. ppm	Average severity of wilt
Penicillin	100	1.24
Streptomycin	100	0.83 (a)
Terramycin	100	0.82 (a)
Isonicotinic acid hydrazide	100	1.24
Captan	1000	1.00 (a)
Glucose	500	1.41
Benzoic acid	1000	1.54
Salicylic acid	250	1.61
Pentachloroisobutyric acid	50	2.25
Pentachlorophenoxyacetic acid	50	2.29
2,4,6-T	50	0.76 (a)
Indoleacetic acid	50	1.83
2,4-D	50	1.54
I.P.C.	50	2.13
Chloro I.P.C.	50	2.33
β-Naphthoxyacetic acid	50	1.42
Naphthaleneacetic acid	50	2.88
Crag 1	50	1.16
Maleic hydrazide	500	...... (b)
Uninoculated check	....	0 (a)
Inoculated check	....	2.48

L.S.D. at 5% level = 1.45

(a) = Significantly less than inoculated check.
(b) = Prevented seedling emergence.

IN PEACHES, POTASH-ENRICHED FERTILIZERS MAKE THE DIFFERENCE


with sufficient potash


without sufficient potash

It makes quite a difference in size and yield—and in the farmer's profit, too—when the basic nutritive elements in a soil are replenished with balanced fertilizers. Potash, a necessary ingredient of these balanced fertilizers, builds up the resistance of crops to diseases, while increasing both quality and yield.

USP's high-grade muriate of potash has the highest K_2O content and is free-flowing and non-caking—important advantages in the manufacture of these modern fertilizers which help American farmers to better crops and better incomes.

UNITED STATES POTASH COMPANY

DIVISION OF UNITED STATES BORAX & CHEMICAL CORPORATION

30 Rockefeller Plaza, New York 20, N. Y.

Southern Sales Office
Rhodes-Haverty Building, Atlanta, Georgia

SUNSHINE STATE POTASH
A PRODUCT OF NEW MEXICO U.S.A.
REG. U. S. PAT. OFF.

HIGRADE MURIATE OF POTASH 62/63% K_2O

GRANULAR MURIATE OF POTASH 60% K_2O MIN.

2 = spots and chlorotic streaks, 3 = necrotic streaks, 4 = death of youngest leaves. The treatments, dilutions, and data for the first experiment are given in Table 1.

Four treatments were promising. These were streptomycin at 100 ppm, terramycin at 100 ppm, captan at 1000 ppm, and 2,4,6-trichlorophenoxy-acetic acid at 50 ppm. These were the only four treatments significantly better than the inoculated check. Crag 1 at 50 ppm was the fifth best treatment, and was considered worthy of another trial.

The second experiment included the 5 materials that looked best in the first experiment. Streptomycin and terramycin were tried at 4 dosages: 100, 200, 400, and 800 ppm. Captan was tried at 1000, 2000, and 4000 ppm. Crag 1 and 2,4,6-T were tried at 50, 100, 200, and 400 ppm. The experiment was carried out in exactly the same manner as the first trial. The results are given in Table 2.

In the second trial, conditions for infection and disease severity were more favorable than during the first trial. This is shown by the general increase in percentage of seedlings showing symptoms, and by the severity of disease in the inoculated check. Much higher dosages of the two antibiotics were required in the second trial than in the first trial to reduce symptom severity significantly. Terramycin at 800 ppm prevented the emergence of seedlings. The results with captan were erratic. All concentrations of the two growth regulators reduced wilt severity significantly. The Crag 1 data indicated that dosages higher than 50 ppm were increasingly less effective in protecting the seedlings against wilt. The dosage series of 2,4,6- T showed no trends.

A third experiment was tried to see whether some of these materials would be effective as dry seed treatments. The materials tried were 2,4, 6-T, streptomycin, captan, and HD-160. HD-160 is sodium S-(2-benzothiazolyl) thioglycolate, reported to have chemotherapeutic activity. The materials were compared as seed soaks and as dry treatments. The concentrations used for soaks are given along with the disease data in Table 3. The dry treatment consisted of shaking 25 seeds with ½ gram of the test material and planting the seeds immediately after treating. All other details of this experiment are the same as for the first experiment, except that the seeds were planted in sand instead of soil.

The severity of disease symptoms was much less in this experiment than in the first two. Only the symptom severity of the streptomycin soak treatment and the HD-160 dry treatment was significantly less than the dry check. The dry streptomycin treatment prevented seedling emergence.

Apparently corn seedlings can be made resistant to Stewart's wilt by treating seeds with antibiotics and other chemotherapeutants. Just how long after emergence resistance persists is yet to be explored. Probably other materials or other formulations of these materials may be much more effective in making corn seedlings resistant.

TABLE 2.

Incidence of Stewart's wilt in corn seedlings growing from seeds soaked in various concentrations of materials which showed promise.

Material	Conc. ppm	Average severity of disease
Streptomycin	100	2.12
"	200	2.32
"	400	2.08
"	800	1.67 (a)
Terramycin	100	2.73
"	200	2.14
"	400	1.81 (a)
"	800	......
Captan	1000	2.17
"	2000	2.78 (a)
"	4000	2.45
2,4,6-T	50	1.52 (a)
"	100	1.70 (a)
"	200	1.60 (a)
"	400	1.62 (a)
Crag 1	50	1.52 (a)
"	100	1.60 (a)
"	200	1.76 (a)
"	400	1.83 (a)
Check	....	2.78

L.S.D. at 5% level = 0.90.

(a) = Significantly less than check.

TABLE 3.

Incidence of Stewart's wilt in corn seedlings growing from seeds soaked or dry treated with chemotherapeutants and an antibiotic

Material	Conc. ppm	Type of Treatment	Average severity of symptoms
Streptomycin	100	Soak	1.09 (a)
Captan	1000	"	1.60
2,4,6-T	50	"	1.32
HD-160	500	"	1.27
Acetone	2000	"	1.52
Check	......	"	1.44
Streptomycin		Dry	...... (b)
Captan		"	1.44
2,4,6-T		"	1.59
HD-160		"	0.76 (a)
Check		"	2.00

L.S.D. at 5% level = 0.81

(a) = Significantly less than dry check.
(b) = Seedlings failed to emerge.

European Corn Borer Heavy In Several States

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is head—Plant Pest Control Section, Plant Pest Control Branch, U. S. Department of Agriculture. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the U. S.

By Kelvin Dorward

DURING late July and early August the European corn borer had been reported as causing extensive damage in several states with heavy second broods possible. In New Hampshire, first brood of the borer was causing more damage than in 1955. Injury to tassels in many untreated fields of Massachusetts ranged from 70-90 percent, and it was expected that any corn not picked by August 10 would be attacked by second-brood borers. Damage in Rhode Island was reported as very heavy, with infestations ranging from 18-35 percent in sweet corn. A heavy and damaging second brood appeared likely. Heavy populations were reported in Rockland, Columbia and Monroe Counties, New York with pupation underway. Maryland, Delaware and Pennsylvania also reported heavy European corn borer damage. Infestation of sweet corn in Frederick and Carroll Counties, Maryland ranged up to 90 percent. Damage to field corn in Baltimore and Montgomery Counties was reported as being moderate. Second-generation moths were appearing in early August in Maryland. Moths were emerging in early sweet corn in Ohio. Cool weather in Illinois had slowed down development and caused abnormally high mortality in some areas, but damaging second-generation borers were expected in certain sections. In some northern and northeastern Illinois counties, first-generation borers were two to four times as heavy as in 1955 with second generation borers expected to be as bad as or worse than last year. Other northern Illinois counties expected about the same number, or possibly fewer second-generation borers than in 1955. In Minnesota, development of the borer was a week to 10 days ahead of 1955 with infestation ranging from 23 to 62 percent. Second-brood moths appeared July 13 in Iowa. This was slightly ahead of 1955 appearance. Infestations in South Dakota were running to the lighter side. Counts late July in two Nebraska counties, Cuming and Hall, were 11 and 14 percent respectively. In late July indications were that controls would be needed in late corn in the eastern area of Arkansas.

THE spotted alfalfa aphid continues to be found in new areas, with specimens of the insect having recently been collected in Kentucky, North and South Carolina and Virginia for the first time. All of the infestations were reported as light to moderate. The insect was on the build-up in several areas during late July and early August. Increases with varying degrees of intensity were reported from California, Utah, Arizona, Colorado, Nebraska, Kansas, New Mexico, Louisiana, Arkansas and Missouri. In Georgia, several additional counties were reported infested for the first time.

A GRAVID female melon fly, (*Dacus cucurbitae*), a serious vegetable pest which sometimes attacks fruit, was taken in a trap on the UCLA Campus, Los Angeles, California, July 24, 1956. As of August 13, no more live specimens had been found, although an extensive survey was underway. The melon fly, taken in a trap that had been placed in the area in connection with the Mexican fruit fly survey, is not known to be established in the United States.

The melon fly, closely related to the oriental fruit fly and the Mediterranean fruit fly, was first known in the Indo-Malayan region and is apparently the most important cucurbit pest there. It was introduced into Hawaii about 1895, where it has been a limiting factor in the production of melon, cucumber, tomatoes and pumpkin. Preferred host plants include: cantaloupe, cucumber, gourds, squash, watermelon, pumpkin, string beans and tomatoes. Sometimes infested are bell apple (passiflora), eggplant, fig, mango, orange, papaya and peach. Over 80 species of plants have been listed as hosts for *D. cucurbitae*.

The melon fly has been recorded from Africa (Kenya only); Asia-Burma, Ceylon, China, Formosa (Taiwan), India, Indonesia, Malaya, Ryukya Islands-Okinawa, Thailand, Philippines, Mauritius and Hawaii.

At one time, the only practical way to produce host fruits in Hawaii was with the use of protective coverings such as soil, paper or cloth. This is still practiced, but progress is being made with chemical controls. Research agencies have developed a malathion bait spray for control of the fly. However, the habit of the fly tending to frequent plants in areas bordering the fields adds to the difficulty of control.

Upon discovery of the fly in Los Angeles, the Plant Pest Control Branch, USDA and California Authorities immediately initiated a survey program. Early in August 2,000 traps were in operation in the area of the find and additional ones were to be made available.

The county of Los Angeles placed restriction on movement of plant material from within five miles of the find, and the state was preparing to take formal quarantine action. The extent of quarantine and control action will depend upon further finds.

DURING late July and early August, cotton boll weevil populations continued to increase in most states. Irrigated cotton in Texas showed an increase in populations as did fields in western Tennessee that had received rain. Light increases were also reported from Louisiana,

(*Turn to Page 133*)

For over 55 years, Louisville Dryers have been solving industry's drying problems and effecting marked economies. The following is intended as an introduction to selecting the right type of dryer.

Q. *What types of dryers are there?*

A. Many types. They can be classified in two basic categories, namely, batch type and continuous.

Q. *What is proper application of the continuous type?*

A. Where large enough capacity is required to make savings in labor, space, and fuel advantageous.

Q. *What are some other advantages of the continuous type?*

A. Uniform quality of dried product. Lower drying cost.

Q. *What types of continuous dryers are most used?*

A. Rotary, Conveyor, Flash, Spray, Atmospheric Drum.*

Q. *Do all of the above types handle the same kind of material?*

A. No. While they discharge a dried solid, Spray and Drum Dryers are fed with a liquid. (Liquids and thin slurries can be handled in the other types by means of special designs or auxiliary equipment, but seldom are).

Q. *How can I be sure of getting the right type of dryer for my operation?*

A. Louisville engineers start by surveying your needs. Then, after considering the pertinent factors, they make recommendations for dryer type, heating medium, etc. Their recommendations can be proved by practical drying tests in General American's pilot plant. Your Louisville Dryer is then designed and built to suit your particular purpose and to fit your individual needs.

Q. *How can I investigate the matter in greater detail?*

A. Call in a Louisville engineer. No cost or obligation.

*Discussions to follow will deal with the subject in more detail.

PROCESS EQUIPMENT DIVISION
GENERAL AMERICAN
TRADE MARK

LOUISVILLE DRYING MACHINERY UNIT

GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer General Sales Office: 139 So. Fourth Street, Louisville 2, Kentucky
Eastern Sales Office: 380 Madison Avenue, New York 17, New York
In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario, Canada
General Offices: 135 S. La Salle Street, Chicago 90, Illinois

There are many ways to kill insects but...

Farmers get better insect control

with HEPTACHLOR

HEPTACHLOR CONTROLS:

Forage insects
- Alfalfa Weevil
- Alfalfa Snout Beetle
- Spittlebug
- Grasshoppers
- Sweet Clover Weevil
- Cutworms
- Armyworms
- Lygus Bugs
- Harvester Ants
- Egyptian Alfalfa Weevil
- Black Vine Weevil
- Plant Bugs
- Leafhoppers
- Clover Root Borer

Cotton insects
- Cotton Boll Weevil
- Cotton Fleahopper
- Cotton Thrips
- Rapid Plant Bugs
- Tarnished Plant Bugs
- Armyworms
- Cutworms
- Garden Webworms

Soil insects
- Corn Rootworms
- White Grubs
- Cutworms
- Wireworms
- Seed Corn Maggot
- White Fringed Beetles (Larvae)
- Japanese Beetle (Larvae)
- Flea Beetles (Larvae)
- False Wireworms
- Root Weevil
- European Chafer
- Ants
- Asiatic Garden Beetle (Larvae)
- Root Maggots
- Onion Maggot
- Strawberry Root Weevils
- Strawberry Root Worms
- Sugar Beet Root Maggot
- Western Harvester Ant
- Eye Gnats

...and many others

Farmers prefer Heptachlor because it controls a wider variety of insects—soil insects, forage insects, cotton insects, and many others. They prefer Heptachlor because it's safe...a residue tolerance for Heptachlor has been established on many crops.

To you, this wide range use and acceptance of Heptachlor formulations means faster turnover of stock and less money in inventories.

A faster growing demand for Heptachlor insecticides is also being built by advertising in your agricultural markets.

Heptachlor is available in many convenient forms and concentrations—wettable powders, emulsifiable concentrates, and granules. For complete information on Heptachlor, and recommendations for its use write to:

VELSICOL CHEMICAL CORPORATION
330 East Grand Avenue, Dept. AC-96, Chicago 11, Illinois
VELSICOL
Representatives in Principal Cities
Export Division, 350 Fifth Ave., New York 1, N. Y.

INDUSTRY News

Spencer Appoints Ihde

Harold C. Ihde was recently appointed assistant sales manager for agricultural chemicals of the Spencer Chemical Co., Kansas City. The new assignment will put Mr. Ihde in charge of the district sales offices as well as the agronomy and technical services.

Mr. Ihde had been acting as director of agricultural sales development since June of last year. He joined Spencer in 1946, before that having been district supervisor for the Carolinas of the United States Gypsum Co. In April 1951, he became assistant to the general sales manager and in July 1953 assistant director of sales development.

•

Ithaca Conference in Nov.

The 18th Annual New York State Insecticide and Fungicide Conference and the 9th Annual Pesticide Application Equipment Conference will be held at Cornell University, Ithaca, N. Y., Nov. 13-15. The conferences will again be held at Bibbins Hall, Cornell Univ.

The joint meeting is a cooperative presentation of the departments of Agricultural Engineering, Entomology, and Plant Pathology at Ithaca, and the Departments of Entomology and Plant Pathology at Geneva. A detailed program of events is expected to be ready prior to the meeting.

Nov. 13 will be devoted to application equipment problems and developments, while Nov. 14 and 15 are set aside for a review of the highlights on research and the recommendations for insecticides and fungicides for N. Y. State. A preliminary report on the Residue Laboratories established this year at Ithaca and Geneva, and a trip through the laboratory at Ithaca are planned also. The conference committee urges that persons wishing to attend make their reservations early, as facilities are limited.

•

Dettelback Opens Branch

Dettelback Insecticide Corp., Atlanta, recently opened a new building in Dallas, Tex., to handle the marketing of the firm's insecticide products in states west of the Mississippi. The firm is listed as a separate Texas corporation.

•

C-VPFA Meeting Oct. 8-10

The Carolinas-Virginia Pesticide Formulators Association, Inc., will hold its annual meeting October 8-10 at the Holly Inn., Pinehurst, N.C., W. R. Peele, secretary-treasurer, announced last month at the association's Raleigh, N.C., headquarters. Officers and directors have requested that all members, associate members, and friends attend the meeting. A complete program will be mailed to members sometime in September.

•

Fert. Round Table, Oct. 16-18

The industry meeting of fertilizer production men, under the direction of Vincent Sauchelli, will hold its sixth annual meeting as the Fertilizer Industry Round Table at the Hotel Shoreham, Washington, D. C., October 16-18. The discussion at this meeting, as in the past, will center on fertilizer production and manufacturing questions and problems. Dr. Sauchelli advises that the reports are therefore of interest primarily to production men and plant superintendents.

The program for the 1956 session is divided into several classifications: (1) sampling of fertilizers and materials; processing and new developments in granulated fertilizers; equipment (feeders, weigh belts, dryers, pulverizers, temperature control etc) in granulation; drying fertilizers and caking control; bags and bagging.

Sessions will be led by experts in each specific manufacturing phase, following which "open discussions" will permit questions, with replies and comments from any one in the group.

•

Hercules Appoints Edgar

The Hercules Powder Co., Wilmington, Del., late last month announced that W. Coleman Edgar has been appointed sales manager of its Naval Stores Department's Agricultural Chemicals Division. He succeeds P. J. Reno, who earlier in the month was named manager of the division.

Mr. Edgar, who was involved with export sales for the division and served in a liaison capacity with government research agencies, will be succeeded by Henry F. Pierce, who had been senior technical sales representative for Naval stores at the company's Los Angales Office.

Mr. Edgar joined Hercules in 1943 as a chemist at its research center, and became a technical sales representative in 1946. He had been with the Naval Stores Department since 1949. Mr. Pierce joined the department in 1951, and will be succeeded at Los Angeles by S. E. Cook, Jr.

•

Crest Building S. D. Plant

Construction of the Crest Chemical Co.'s new $200,000 plant at Watertown, S. D., is expected to be completed in October. The plant, which will have a capacity of 12,000 tons of granular fertilizer per year, is being erected by the D. M. Weatherly Co., Atlanta.

•

Urea Plant Nears Completion

Construction on the first urea plant on the West Coast is nearing completion, reports the Shell Chemical Co., New York. The plant, at Ventura, Caif., is adjacent to Shell's 150-ton-per-day ammonia plant, and will receive its raw materials, ammonia and carbon dioxide, from the ammonia plant by pipeline.

The new plant, to be completed early this fall, is designed to produce 100 tons of urea per day, and is the first plant in the U. S. to employ the Montecatini process.

Garden Shows to Stress Sales

Eight ways to increase sales of garden supplies will be presented by Garden Foundation, Inc., in an industry-wide sales training program for the coming year. The sales program will be featured at the National Garden Show in Chicago at Navy Pier, November 18-19-20, and in New York City at Kingsbridge Armory on January 13-14-15, 1957.

"How Leading Dealers Sell More Garden Supplies" is an audio-visual sales personnel training plan developed specifically for garden supply dealers, compiled by Drs. Max E. Brunk and Lawrence B. Darrah, professors of Marketing at Cornell University. It is based on field research in garden supply stores carried out by the Cornell staff. The second feature to be presented in the program is "Tested Ideas for Store Layout and Display," being prepared by Drs. Paul L. Pfeiffer, Victor P. Gravereau, and Lloyd O. Thornton, professors of Marketing at Kent State University. Development of this subject will center around a model store exhibit at the Shows, where these researchers will demonstrate successful window, interior and exterior garden store displays, store layout and traffic control, all based on field research carried out by their staff at Kent State.

•

Nutrient Trend Continues Up

A continuation of the trend toward increased use of higher nutrient content fertilizers is reported by the U. S. Department of Agriculture in the latest of its annual surveys on this point. With consumption of the primary crop nutrients increasing 3.8% in the 1954-55 crop year, this marked the sixteenth consecutive year that such a gain has been registered. This increased use of the primary nutrients occurred in spite of a slight decrease in the tonnage of fertilizers used in the 54-55 crop year.

In the face of declining tonnage, use of nitrogen increased 6.1% (about 113,000 tons) available phosphoric acid 2.2% (50,000 tons) and potash 3.4% (61,000 tons).

The report by the Agricultural Research Service of the USDA also shows a striking gain of 165,000 tons (27% above 1953-54) in the consumption of secondary and trace-nutrient materials during the 1954-55 crop year.

•

Hercules Shifts Executives

P. J. Reno

Richard T. Yates, manager of the Agricultural Chemicals Division, Naval Stores Department of Hercules Powder Company, has been given a special assignment to investigate new fields of chemistry in which the company is interested. P. J. Reno, sales manager of the Agricultural Chemicals Division, will succeed Mr. Yates as division manager.

Mr. Yates was named manager of domestic sales for the Naval Stores Department in 1940, and was appointed assistant director of sales for the department in 1945. When the department established an Agricultural Chemicals Division in 1954, he was named manager.

Mr. Reno joined Hercules in 1941 in the sales division of the Naval Stores Department. At the close of World War II he was assigned to the Southwest, and played a leading role in the introduction of toxaphene insecticides to cotton growers, state and federal agricultural agencies, and manufacturers of dusts and sprays, in that region.

In 1948 he was named manager of the new Dallas sales office for the Naval Stores Department. He served in this capacity until earlier this year when he was named sales manager of the department's Agricultural Chemicals Division with headquarters in Wilmington.

N. Cent. Weed Conf.

The annual session of the North Central Weed Control Conference will be held this year, December 10, 11 and 12, at the Hotel Sherman, Chicago. The program for this year's meeting, like the 1955 session, will consist of volunteer papers from workers in the herbicide field. The following sectional programs are planned: Field crops; Botany and plant physiology; Industrial weed control; Turf; Weeds; Horticulture; Regulatory and extension; and water weeds and weed control in wildlife habitats. Titles for papers should be submitted before August 15. F. W. Slife, University of Illinois, is chairman of the Program Committee, while O. C. Lee and G. F. Warren of Purdue University are in charge of local arrangements.

•

IMCC Marketing Execs.

Anthony E. Cascino, director of marketing, International Minerals & Chemical Corporation, Chicago, has announced the appointment of three new marketing executives for the company. Heading advertising and sales promotion is Frank J. O'Neill, formerly director of advertising and sales promotion for Sidney Wanzer & Sons. Henry E. Wessel has been named manager of product development. Before joining International, Mr. Wessel served as manager of the Engineering Economics Division of the Midwest Research Institute. Emanuel Heimberg becomes manager of market analysis.

•

Form Mexican Company

A new Mexican chemical company, financed by $2 million in United States and Mexican capital, is being organized with backing by two major American firms. Montrose Chemical Corp. of California, and Stauffer Chemical Co., New York, will jointly manage the new company, Montrose Mexicana S.A., and will each receive a substantial stock interest in the company.

In addition to the U.S. and Mexican funds, the Banque Nationale pour le Commerce et l'Industrie, of Paris, is reported to have agreed to grant a loan of $2 million.

Geigy Chemical Moves To Ardsley, N. Y.

'Architects' sketch of new plant.

Geigy Chemical Corp. has announced removal of its headquarters from New York City to Saw Mill River Road, Ardsley, N. Y. The Corporation's Agricultural Chemicals, Industrial Chemicals, and Pharmaceuticals Divisions opened for business in Ardsley.

Geigy's new headquarters include air-conditioned administration and cafeteria buildings, as well as a laboratory and service building, all of reinforced concrete with exteriors of insulated white porcelain enamel panels. Mail address of the new plant is P.O. Box 430, Yonkers, New York.

N. Carolina Fertilizer Course

The National Safety Council conducted a course for fertilizer plant supervisory personnel in Wilmington, N. C., August 16 and 17. The course was conducted to instruct supervisors in the latest techniques of accident prevention and to train them in setting up their own plant safety training programs. The course included illustrated lectures, a half dozen safety films and featured a panel discussion on "Highlights of Fertilizer Plant Accident Causes."

•

Predict Fertilizer Use Gain

The Value Line, investment survey, published by Arnold Bernhard & Co., New York, in a release dated August 13th, predicts a substantial increase in fertilizer consumption over the long term. While recognizing that temporary price weakness exists in the fertilizer market, particularly in anhydrous ammonia because of the recent sharp expansion in productive capacity, the survey predicts that the Soil Bank, more liberal bank credit, larger scale farming, more scientific farming and the plain desire of the business man-farmer to make more money all add up to a prediction of increased fertilizer use in the near future. "Plants are built in anticipation of demand, not as a consequence of it," the survey notes, and observe further that, if farmers were to apply the quantities of fertilizer that agricultural colleges recommend, fertilizer companies would have to double their output to meet the demand.

•

N. J. Fertilizer Conference

The annual New Jersey Fertilizer Conference will be held at the Rutgers University College of Agriculture, New Brunswick, on Thursday, Sept. 27, it was announced late last month. The meeting, open to all representatives of the fertilizer industry, will provide an opportunity for industry representatives and extension workers at the college to discuss problems and review new developments. A complete program is expected to be announced early in the month.

•

Dorr Announces Expansion

Dorr-Oliver, Inc., Stamford, Conn., announced recently expansion of its field engineering division of the newly-established sales services department. With the expansion, field engineers were assigned territorial areas generally coinciding with D-O sales divisions.

Area field engineering supervisors are located in the headquarters of the various domestic industrial and sanitary division offices. Under the new system, field engineers are responsible for inspection of equipment after erection, supervision of erection, trouble-shooting, and supervision after initial operation.

New England Fertilizer Meeting

The annual New England Fertilizer Conference, conducted in cooperation with the National Plant Food Institute, will be held Sept. 12 at the Bald Peak Colony Club, Melvin Village, New Hampshire.

L. A. Zehner of the Federal Reserve Bank of Boston will be moderator of a panel of New England experts who will discuss "The Future of New England Agriculture." Dr. W. K. Burkett of the University of New Hampshire will speak on "Effects of Fertilizer Usage on Cost of Production of Farm Products," and Ford Prince, also of the University of N.H., and George Frick, of the USDA, will discuss the economics of pasture improvement.

•

Elect New Spencer Director

Spencer Chemical Co., Kansas City, has announced the election of James F. Brownlee of New York, a partner in J. H. Whitney and Co., to the company's board of directors. The election of Mr. Brownlee fills the vacancy created by William H. Jackson, who resigned to accept an appointment from President Eisenhower as a Special Presidential Assistant.

•

Nitrogen Group to Expand

The board of directors of the National Solutions Association, with headquarters in Chicago, recently announced plans for an extensive expansion of the association's services and activities. Among the group's decisions was the retaining of the professional trade association management firm, Storms & Westcott, Chicago, to manage the affairs of the association under the direction of its officers and board.

The directors announced the dates for the meeting of the association in Sioux City, Iowa, as Oct. 15-17. Also, plans were announced for a monthly news letter to all members, an intensive membership drive, news releases to the trade press and local newspapers, development of grant in aid to colleges for nitrogen and liquid fertilizer experiments, and the compilation of a complete product file on all types of equipment for the trade.

Here is a new high in preventing slippage. You can't see Hudson's "Magnetized" coating, or feel it. But it is applied uniformly to every square inch of every surface of the bag. When stacked, "Magnetized" sacks actually clutch each other.

Standard tilt tests show firm holding power up to a 40° angle. Costing only pennies in upcharge, "Magnetized" Multiwalls can save you dollars in usage.

You save in breakage, you save in time, you save in possible injuries. And, most practical, you save in space because *both you and your customers can now stack higher with safety.*

Let us demonstrate this safer finish. Write Dept. 19 for convincing "do-it-yourself" test.

HUDSON
Betterbags
HAMMOND

HUDSON PULP & PAPER CORP.

477 Madison Avenue • New York 22, N. Y.

Plants at:
PINE BLUFF, ARK. • PALATKA, FLA. • WELLSBURG, W. VA.

Agricultural Chemicals Prominent on Program at ACS Meeting

THE official program for the 130th national meeting of the American Chemical Society at Atlantic City Sept. 16-21, includes a large number of general and technical subjects of particular interest to the fertilizer and pesticide industries. The following are among the reports and respective speakers scheduled:

A New Organophosphate Pesticide—Stauffer Experimental Compound R-1303, by L. W. Fancher, G. G. Patchett, and S. C. Dorman.

Quantitative Studies on the Toxic Action of Metal Ions to Fungus Spores, by Lawrence P. Miller and S. E. A. McCallan.

The Determination of Trichlorobenzoic Acid Herbicide Residues on Corn Plants and in Shell Corn, by George W. Darling and Lewis E. Tuffts.

Selective Toxicity in Organophosphorus Insecticides, by John E. Casida.

The Relative Insecticidal Activity of Some 2,4,5-Trichlorophenyl Phosphorothioates, by E. E. Kenaga and P. D. Ludwig.

The Role of Nitrogen in Our Nation's Future, by C. Y. Thomas.

Phosphatic Fertilizers—1956—How Far? — Where To?, by Edwin Cox.

Potash in Food Production, by J. Fielding Reed.

Promoting Proper Plant Food Usage, by Russell Coleman.

Planning, Research and Development for the Successful Commercialization of Pesticides, by J. T. Thurston.

Manufacturing for the Pesticide Industry, by J. Steele Brown.

End Use Patterns Present and Projected for Pesticides, by F. W. Hatch.

Problems Related to the Successful Marketing of Pesticides, by Ernest Hart.

Rapid Determination of Magnesium in Mixed Fertilizer, by Henry E. Van Thiel and William J. Tucker.

Agricultural Value of Organic Wastes, by S. J. Toth and W. H. Kelly.

The Stability of Certain Insecticides in Mixtures with Fertilizers, by R. M. Creamer and T. G. Lamont.

Anti-Caking of Commercial Pelletized Fertilizers and Various Fertilizer Components with Fatty Chemicals, by Robert E. Baarson, M. R. McCorkle, and Duane T. Ohlsen.

Production of Ordinary Superphosphate for Immediate Use in Ammoniation and Granulation Processes, by R. D. Young, and F. G. Heil.

The Control of Air Pollution from Fertilizer Plants, by J. E. Yocom, G. F. Sachsel, and R. D. Ellsworth.

Granulation of Mixed Fertilizers in Experimental Equipment, by Herbert F. Rapp and John O. Hardesty.

Manufacture of Granulated Triple Superphosphate, by William R. Fort, William C. Weber, and Gordon C. Inskeep.

Use of Ammoniating Solutions Containing Urea in TVA Granulation Process, by A. B. Phillips, G. C. Hicks, N. L. Spencer, and Julius Silverberg.

The Team Approach to Fertilizer Economics Research, by Odin Wilhelmy, Jr., L. L. Lortscher, and G. F. Sachsel.

Factors Governing Use of Trace Elements with Various Fertilizer Formulations, by A. A. Nikitin, S. D. Bristow, and J. P. Goode.

Davison's Trenton Process for Ammoniating and Granulating Fertilizers, by J. E. Reynolds, Jr., N. K. Alfrey and G. W. Rose.

Utilization of Calcium Metaphosphate in the Production of Granular Fertilizers, by A. B. Phillips, R. D. Young, J. S. Lewis, Jr., and Julius Silverberg.

Distribution of Granular Mixed Fertilizers to Retail Trade in 1954-55, by Walter Scholl, Hilda M. Wallace, and Esther II Fox.

Urea-Form Sales and Acceptance, by James M. O'Donnell.

•

Merck Creates 2 New Posts

Two new posts have been created in the Chemical Division of Merck & Co., Inc., Rahway, N. J., to facilitate the firm's expanding research and sales program in agricultural chemicals. J. J. Simons, a market specialist, has been named plant products manager; and J. E. Driggers was appointed sales promotion and field service man for the Florida area.

•

Southern Weed Conf. Jan. 23

Latest developments in the use of chemicals to control weeds in all phases of Southern agriculture will be featured during the 10th annual meeting of the Southern Weed Conference scheduled to be held in Augusta, Georgia, Jan. 23-25, 1957.

All phases of research and education in chemical weed control will be reviewed according to Dr. W. B. Albert of the South Carolina Agricultural Experiment Station, Clemson, S. C., conference president.

A complete program is now being prepared and will be announced prior to the conference. Dr. J. K. Leasure, of the Dow Chemical Co., Midland, Mich., is serving as chairman of the program committee for this conference.

Officers for the conference are: president, Dr. W. B. Albert; vice president, Dr. E. G. Rodgers of the University of Florida, Gainesville, Florida; and secretary-treasurer, Dr. Walter K. Porter, Louisiana State University, Baton Rouge, Louisiana.

All sessions of the conference will be held at the Bon Aire Hotel in Augusta, Georgia.

•

Nixon in New A-W Position

C. Tom Nixon was recently appointed assistant secretary of the Ashcraft-Wilkinson Co., Atlanta. In his new post he will be in charge of technical work in connection with the company's distribution of nitrogen products produced by the Escambia Bay Chemical Corp., and sulfur and potash produced by Duval Sulphur & Potash Co. Prior to his joining the company, Mr. Nixon was with E. I. Du Pont de Nemours & Co.

At the same time as Mr. Nixon's appointment, the company's board of directors announced the appointment of H. Wayne Tyson as assistant treasurer.

•

Ohio Air Dusting Course

The first special short course in the Columbus, Ohio area for training of pilots interested in use of aircraft for crop dusting, seeding, and other agricultural purposes will be held this fall at Ohio State University, Columbus.

The university, in cooperation with the Ohio Aviation Board, has scheduled the course for Oct. 15-Nov. 21. It is planned to meet the particular needs and problems of aerial applicators in Ohio and other states from Minnesota to Pennsylvania.

The course, under the direction of Prof. Richard L. King of the university's School of Aviation, will include approximately 100 hours of ground school and 30 hours of flying. Among the ground school subjects will be equipment calibration, aircraft maintenance, insect control, weed and brush control, defoliation, seeding and fertilizing, disease control, laws and regulations, and customer relations.

Additional information may be obtained by writing to the Ohio State University School of Aviation, Columbus 10, Ohio.

Raymond GRINDING MILLS

For Every Formulation:
Field Strength Insecticides, High Concentrate Mixtures, Lower Concentrate Products, Sulphur Bearing Insecticides.

RAYMOND
IMP MILL

Compact unit for grinding, blending and classifying.

INSECTICIDE POWDERS

RAYMOND
ROLLER MILL
with Whizzer
Separator

An all-purpose pulverizing unit for handling large capacities.

The extensive line of Raymond Imp Mills and Roller Mills enables you to select just the right size and type of unit for handling your insecticide grinding problem.

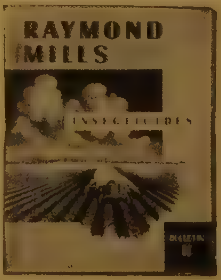
In scores of plants, Raymond Mills are standard equipment where they are showing record economies, due to these special advantages:

Material handled automatically in a clean, dust-free system.

Wide range fineness range and ease of control by one simple adjustment of the Whizzer Separator.

Flexible installation ready fitted to your plant layout. Consistent low cost of operation, supervision and maintenance.

For further information, write for Bulletin No. 68.



COMBUSTION ENGINEERING, INC.

Raymond Division

1314 NORTH BRANCH ST.
CHICAGO 22, ILLINOIS

SALES OFFICES IN
PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd. Montreal, Canada

Shell Introducing "Phosdrin"

A new systemic insecticide that allows control of insect attacks on crops within one to three days of harvest has just been announced by Shell Chemical Corp. It will be available in limited quantities for late summer sales. The product is an organic phosphate, trade-named "Phosdrin." It has been given experimental label acceptance by the U. S. Department of Agriculture for use against insects attacking certain fruit and vegetable crops.

One of Phosdrin's chief advantages, according to Fred Hatch, manager of agricultural chemicals for Shell, is its rapid dissipation. This gives farmers and growers a product they can use against insects up to one to three days before harvest, he said. Within that time, Phosdrin will have killed the insects, and the insecticide on the plant will have dropped below the temporary tolerance established by the Food and Drug Administration for experimental sales.

Like all phosphates, Phosdrin is of course highly toxic. Users of the product are being advised of its potential danger and the necessary safety precautions for its handling and use.

Shell Chemical will have the product available in limited quantities for late summer and fall crops. It will be sold by formulating companies in emulsible, dust and granular forms.

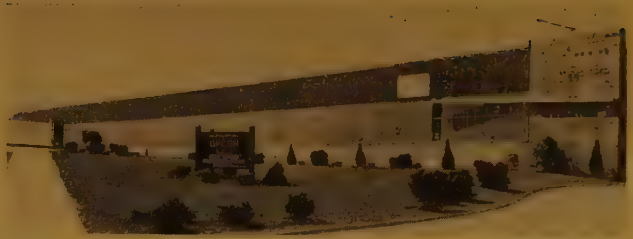
•

Texas Contracts to C. & I.

The Texas Co. recently awarded a contract to the Chemical and Industrial Corp., Cincinnati, Ohio, for the design and construction of two separate units of a new nitrate plant. The first of these is a 200-ton per day nitric acid plant, equipped with a special fume eliminator to remove nitrogen oxides from the exhaust gases. The second unit will be an ammonium nitrate solutions plant capable of producing solutions A.B.C,D, and U at a rate of 274 tons per day. This second unit will be equipped with a CSC Stengel Reactor.

The plant is expected to go into operation in 1957. Both units are part of the company's expansion program.

Orcoa Builds Garbage Conversion Plant



Modernistic front of Pennsylvania plant.

Organic Corp. of America, Pittsburgh, held a plant inspection tour, August 15th, at their new waste disposal fertilizer plant at McKeesport, Pa. The new plant features the Orcoa process developed by H. G. Burr Co., which takes a city's entire accumulation of raw garbage, trash and waste, and within 14 to 21 days transforms it into fertilizer.

Separation and "double" pick-up of garbage and trash are eliminated with the Orcoa process. All material is pulverized in grinders, then rapidly decomposed by injection of enzymes. The entire process is said to be odorless and smokeless and involves no residues.

ESA Meets in N. Y. Dec. 27

The annual meeting of the Entomological Society of America is to be held at the Hotel New Yorker, New York City, December 27-30. Dr. P. W. Oman, Entomology Research Branch, USDA, Beltsville, Md., is chairman of the Program Committee. Deadline for submission of titles of papers for presentation at the meeting was September 1, and it was indicated that the full program would be ready for release early in September.

•

Soil Improvement Com. to Meet

The annual meeting of the Middle West Soil Improvement Committee, will be held Thursday, October 25, at the Sherman Hotel in Chicago. In addition to the morning business meeting, a new feature this year will be a short afternoon session devoted to a showing of new MWSIC visual aids. Scheduled for showing will be selected pictures from color film strips, TV shorts and other promotional aids designed to spur the use of fertilizer.

On the agenda for the morning annual business meeting will be detailed reviews by MWSIC Executive Secretary Z. H. Beers, of the results of the committee's 1956 educational publicity work with farm magazines, radio stations, county agents and other extension workers. Summaries will be presented of the results of field trips by MWSIC staff members, work with colleges and experiment stations and contacts with research agronomists and extension men. State-by-state reviews will be presented on MWSIC-supported research on fertilizer use at the various colleges.

•

Sweeney To Sinclair Post

Sinclair Chemicals, Inc. last month announced the appointment of Robert C. Sweeney as manager of market development in charge of the company's market research and product development. His headquarters will be in New York.

Previous to joining the company in 1952, Mr. Sweeney was with the American Sugar Refining Co., Philadelphia, and the Hercules Powder Co., Wilmington. He is a member of the American Chemical Society, the Chemical Market Research Association, and the Chemical Industry Association.

•

Sinclair Names Ray Smith

Sinclair Chemicals, Inc., New York, early last month announced the appointment of Ray C. Smith as manager of domestic sales. Previously manager of market development, he will manage the company's chemical marketing activities, with headquarters in New York.

In 1947 Mr. Smith entered the Sinclair Research Laboratories at Harvey, Ill., as technologist, Lubricants Division, and rose to the position of section leader, lube processing section. In 1952 he was appointed

Appoint Ogden to Mex. Post

Robert P. Ogden has been appointed general manager of the Industrial Quimica Pennsalt S.A. de C.V., a new subsidiary of Pennsalt International Corp. in Mexico. At the time of his appointment he was manager of Pennsalt's plant at Riverview, Mich.

Pennsalt International's other Mexican affiliates are Pennsalt de Mexico, with plants in Mexico City and Navojoa, and Minerales y Metales Industriales, which operates the country's largest fluorspar mine near San Luis Potosi.

•

Dedicate Australian Plant

A new sulfuric acid plant, which will produce 100,00 tons per year for the manufacture of superphosphates, was dedicated recently at North Birkenhead, South Australia. The plant is owned by Sulphuric Acid Ltd., and construction costs were shared by the federal and state governments. Sulphuric Acid Ltd. was organized in 1952 by three South Australian companies, Cresco Fertilizers, Ltd., Wallaroo-Mount Lyell Fertilizers, Ltd., and The Adelaide Chemical and Fertilizer Co., Ltd.

The plant will use iron pyrites as source for its sulfur, and is expected to supply all of South Australia's requirements for sulfuric acid.

•

Boatright Joins Escambia

Dr. Leslie G. Boatright has joined the Commercial Development Department of the Escambia Bay Chemical Corp., it was announced at company headquarters in New York. Dr. Boatright was formerly manager of market development of the Jefferson Chemical Co., Houston, Texas. and prior to that, a research chemist with the Stamford Research Laboratory of American Cyanamid Co.

•

Granular Heptachlor

Application of heptachlor in granular form is being recommended by Velsicol Chemical Corp., Chicago, for the control of boll weevil infestations, on the basis of test work conducted at state experiment stations over the past three years. Experiments in Louisiana and in the Rio Grande Valley indicated that single applications of 25 to 40 lbs. of 2½% heptachlor granules per acre early in the season held infestations in check for periods up to two weeks. Best results were reported to have been obtained by applying the insecticide granules on the surface of the ground when the first brood of emerging weevil adults are coming out of the fallen squares.

•

Cotton Conference Held

The Tenth Annual Beltwide Cotton Mechanization Conference was held Aug. 22-24 at the Biltmore Hotel, Memphis, Tenn., with first reports indicating a record attendance of 600. In addition to the addresses and meetings, delegates were taken on a tour of the Georgia Agricultural Experiment Station at Griffin, Ga.

Exec. Changes at V-C

A series of new executive appointments at Virginia - Carolina Chemical Corp., Richmond, Va., following the management change which developed out of the recent proxy fight, has been announced by William C. Franklin, a new director and temporary president of the company. F. E. Butler, secretary of the firm since July 1, was named general counsel, succeeding John W. Pearsall. Richard E. McConnell becomes secretary.

C. C. Arledge, vice-president in charge of sales, named his former assistant, A. Percy Gates, as general sales manager of the fertilizer division. John L. French and Charles E. Workman, assistant sales managers in the fertilizer division, were named sales managers of the division.

Summit Sericite Plant In Full Production

The Summit Mining Corporation's new processing plant at Aspers, Adams County, Pa., recently went into full production processing the firm's sericite ore. It is producing "Ser-X," a filler and diluent for insecticides and other agricultural chemicals, using ore from Summit's open pit mining operation near Benderville, Pa.

The new plant's prime equipment is a Hardinge disc roll mill no. 9 — the first commercial operation of this particular mill on the North American continent This spring Summit installed a second such mill to double the plant's originally-planned capacity of upward of seven tons per hour.

The plant was specially-designed to provide as much flexibility as possible. It is located on the Reading Railroad, supplying both box and covered hopper cars with 50 or 70 lb. bags of the processed material. Bulk material is conveyed from the plant to hopper cars by air slides, and there are also loading platforms for truck transport. Summit reports that it is presently shipping its Sericite material into 16 states and four foreign countries.

Summit's product is being produced in an average particle size of 4.4 microns, and is said to provide a chemically inert and relatively inexpensive filler and diluent especially suited for agricultural chemicals.

PESTMASTER* DDT

easier to use
costs less to process

YOU GET A HARD, CLEAN, STABLE POWDER when you specify Pestmaster Technical Grade DDT. Formulators know from experience that it costs less to grind powdered Pestmaster DDT than DDT in flake form. This cost differential means extra profit for you . . . and the quality of Pestmaster is high. It will add stability and uniformity to your formulations.

If you are a user or exporter of 75% DDT Wettable powder, you should investigate Pestmaster. Check its resistance to tropical conditions, its uniform wettable and suspension properties, its carefully controlled packaging which preserves its qualities. Pestmaster DDT is doing a job wherever it goes around the world . . . Asia, Africa, South America, Europe, and here at home. Write for prices, conditions, and samples, or use the coupon.

Send a sample of **PESTMASTER* DDT** Technical Grade (100%) ☐ Prices ☐
Send a sample of **PESTMASTER*** 75% Wettable ☐ Prices ☐
Name ....
Street Address ....
Company or Government Agency ....
City .... State .... Country ....

******

©

D-56-1
*Reg. U.S. Pat. Off. **T.M.

MICHIGAN CHEMICAL CORPORATION
520 Bankson Street **Saint Louis, Michigan**
EASTERN SALES OFFICE: 230 Park Avenue, New York 17, New York

Mexico Increasing Sulfur Output; World Supply Ample

LOW-COST foreign production of sulfur is posing a serious competitive threat to American sulfur producers, the *New York Journal of Commerce* reported last month. A tremendous increase of production of the element in Mexico and in other countries is expected to hold down the price of sulfur substantially, and possibly even result in some price reductions. The element had been in critically short supply during the Korean War, but with new production, coupled with increased U.S. production, an ample world supply is now forecast.

The report says that the two major American producers, Texas Gulf Sulphur Co. and Freeport Sulphur Co., are now "somewhat belatedly" entering the Mexican picture, supplementing their Frasch-process operations in the Gulf States area. Texas Gulf is engaging in production at Nopalapa, on the Isthmus of Tehuanepec, after having completed two barge-mounted, self-contained plants. Freeport has launched a wide search for Mexican deposits elsewhere.

Mexico is not alone in substantially increasing its domestic production. The article cites England, Japan, Italy, and Canada as being among those countries attempting to stimulate their own domestic production of sulfur to reduce their reliance on U.S. sources. Last year England completed three plants at which sulfuric acid is made from anhydrite, reducing England's imports by 100,000 tons. Japan has increased production enough to plan export of some of next year's output. Italy has announced its intention to restore Sicilian production through financial subsidy, and Canada's recovery of the element from natural gas has been increasing steadily. According to the *Journal of Commerce*, "Exports of U.S. Sulfur have declined from 1,605,000 tons in 1954 to 1.3 million tons in 1955, and may drop below 1 million tons this year."

These cutbacks, plus the steel strike (that industry is a major user of sulfuric acid) and the usual summer lull, have combined to cause the major producers to taper off production slightly.

Of the countries named, Mexico is the chief country threatening U.S. supremacy of world markets. That country's production in 1954 was only 86,000 tons, but in 1955 jumped to more than 500,000 tons. This year Mexican production is expected to reach close to one million tons, and in 1958 may well exceed 1.6 million tons. Current U.S. production is in the vicinity of six million tons.

In addition to cheaper labor and improved techniques, Mexico can ship sulfur duty-free into the American market, using foreign ships at lower rates than the American ships that domestic producers must use. These factors have enabled Mexico to increase its exports to the United States from 31,000 tons last year to a figure estimated to approach 150,000 tons in 1956.

•

USDA Training Cuts Aid Bill

Technical assistance in insect control is costing less and reaching larger areas each year in the Near East, North Africa, and South Asia, as more countries are taught to handle their own pest control problems, reports the USDA. The USDA's Agricultural Research Service has been assisting the State Department's International Cooperation Administration and the governments of cooperating countries abroad to develop practical insect control programs.

India and Jordan are now able to handle their own pest control problems, with U.S. specialists available for consultation when requested. Iran and Iraq are approaching independent control, and Pakistan is close behind. Programs are continuing in Ethiopia, Lebanon, and Afghanistan, with new programs in Egypt and Libya just getting under way. American expenditures for these programs have consequently tapered off, from $567,000 in only three countries in 1951 to an estimated $225,000 in ten countries this year.

The expansion in pest control activities in these countries has created new markets for chemicals, trucks, airplanes, and insecticidal spray equipment. The USDA reports that some 400 tons of modern insecticides, 49 spray planes, 188 trucks, 544 power sprayers, and over 10,000 handsprayers have been imported into these areas, most of which have never before employed large-scale insect control measures. During this time, 40 pilots, 24 airplane mechanics, and 142 plant protection officers have been locally trained, and countless individuals have been shown how to use and service insecticide equipment in their own countries.

•

Fertilizer Need Cited

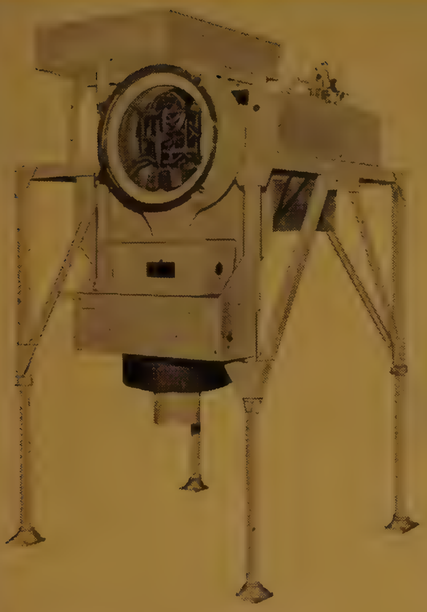
"There is no problem facing the farmer today that is of greater importance to a sound and stable agriculture than soil fertility," said Dr. Randall J. Jones, dean of resident instruction at Oklahoma A. & M. College, Stillwater, before an audience of fertilizer dealers, businessmen, and agricultural leaders at a recent meeting in Oklahoma City.

Speaking at the "Wheat Belt Special" dinner, sponsored by Olin Mathieson Chemical Corp., Dr. Jones said, "It would have been difficult to persuade the early settlers who broke virgin sod in Oklahoma that the soil would ever need anything except water to grow good crops. A half century of soil depletion, however, has convinced many of the pioneers' grandsons that the soil is not an inexhaustable resource.

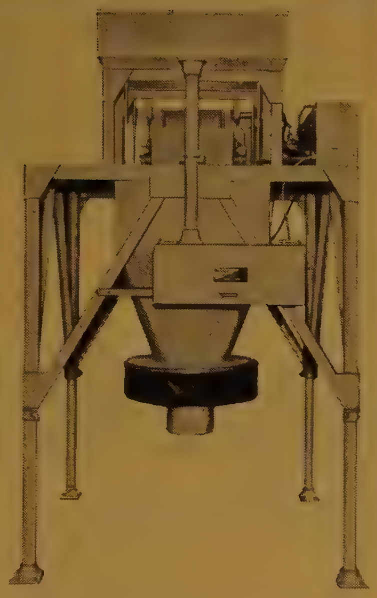
"Although fertilizer tonnage has increased tenfold in Oklahoma since the war years, the use of fertilizer is far below what it should be for efficient production and maintenance of soil fertility."

Dr. Jones praised the trend toward greater use of high analysis fertilizer as "a very good one." He said, "Another factor which may be signficant is indication that ammonium phosphate may have certain advantages as a phosphate carrier, especially at low soil moisture levels."

When your trade demands 50's keep your packaging costs down with the UNION I&C BAGGER



MODEL UB 101 (Dial Scale)
for finer weight tolerances and visible weight check



MODEL UB 100-A (Double Beam Scale)
for accurate, high speed weighing of granular materials

If you are faced with the necessity of packaging in 50-lb. units, the Union I & C Bagger can help you eliminate the increased packaging expenses you would otherwise face.

The Union Bagger easily handles up to twenty 50-lb. bags a minute. You can convert from 100-lb. containers and still maintain your net tonnage per hour.

Over 300 Union Baggers have been installed by fertilizer manufacturers in the past two years alone. The savings you make with this automatic and practically fool-proof high speed equipment not only improve your competitive position, but your savings alone actually pay the full cost of the Bagger in a remarkably short period of time.

We will be glad to demonstrate with actual figures based on recent fertilizer installations.

Ends "rush season" production worries, brings about greatest savings, fertilizer executives report

SOLVES RUSH SEASON SHIPPING PROBLEMS

"Your UB-101 machine has proved to be more than adequate in every phase of performance."

P. L. Etheredge, Secretary-Treasurer
Etheredge Guano Company, Inc.,
Augusta, Ga.

ELIMINATES ALL OVERTIME

"We were able to eliminate all overtime during the past two seasons, which I am convinced more than compensated us for the small cost of the baggers.

"The speed and accuracy of these units made the many thousands of tons we handled during the rush period a pleasure.

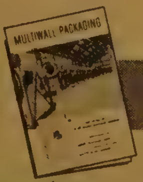
"One of the most significant features is the lack of maintenance. The amount we have expended would not exceed $25 for the past two years."

C. P. Belding, Supt., F. S. Royster Guano Company, Athens, Ga.

PRODUCTION UP 50%—LABOR SAVINGS 33%

"The Union I & C Bagger has enabled us to increase production to 50 to 60 tons per hour, compared with 35 to 40 tons in the past, and we are able to do it with two men instead of three. The Union Bagger is as fast and efficient a bagger as I've ever encountered. Its performance has been little short of sensational."

C. L. Durham, Plant Superintendent
Dixie Guano Co., Laurinburg, N. C.



NEW! SEND FOR UNION'S AUTHORITATIVE AND PRACTICAL "FERTILIZER PACKAGING WORK KIT"

Package Engineering Department
Union Bag-Camp Paper Corporation
233 Broadway, New York 7, N. Y.

Please send immediately your new "Fertilizer Packaging Work Kit" which includes a new calculator for figuring our bagging cost-per-ton. I understand there is no charge or obligation.

Name .... Title ....

Company ....

Address ....

City .... Zone ..... State ....

UNION I&C BAGGER

Automatic Weighing and Filling Machine for Open Mouth Bags

Manufactured by INGLETT & CORLEY, INC., AUGUSTA, GA.
Exclusive Sales Agents:
PACKAGE ENGINEERING DEPARTMENT
UNION BAG-CAMP PAPER Corporation
233 Broadway, New York 7, N. Y.

Manufactured by
CHEMAGRO
CORPORATION
New York, N. Y.

Under license from
FARBENFABRIKEN
BAYER
Leverkusen, Germany

DIPTEREX*

Sugar Bait Fly Killer

DIPTEREX attracts and kills both resistant and non-resistant strains of houseflies with outstanding effectiveness. It is approved for use inside and around dairy barns, poultry houses, stables, stock pens and similar areas where fly populations are intense or bothersome.

The active ingredient of DIPTEREX Sugar Bait Fly Killer is Bayer L 13/59, a recent chemical development of Farbenfabriken Bayer.

DIPTEREX is available in ten pound metal pails packed four to a case and in one pound canisters packed twelve to a case.

***Registered Trademark**

CHEMAGRO CORPORATION

437 FIFTH AVENUE, NEW YORK 16, N. Y

Polyethylene film for variety of agricultural uses

In the accompanying photographs are illustrated two of the promising applications of polyethylene film for direct use on crops. In the upper photo, the film is being used as a strawberry mulch on the Ishibashi Brothers Ranch in Torrance, Calif., where it has reportedly increased the harvest by roughly one third. In the lower photo, the film is being used to cover tomato plants, protecting the late-ripening tomatoes from adverse weather. These specially-formulated covers reflect heat rays, but permit penetration by the growth-stimulating rays (violets, blue violets, blues and greens).

MILLIONS of acres of crop land may be covered with polyethylene film in the next decade, according to a prediction made recently by Dr. C. E. Staff, Bakelite Co., a division of Union Carbide and Carbon Co., New York. Dr. Staff points out that specially-formulated polyethylene, of the type being made by his company, offers an inexpensive way to keep weeds under control, cut down irrigation costs, and produce higher and better crop yields. At the same time, it can mean sales in the millions of dollars for the plastics film and sheeting industry, he predicts.

Since 1953, agricultural uses of polyethylene film have grown from a few test patches at widely scattered agricultural experiment stations to so-called "magic carpets" covering several hundred acres. "Magic carpet" is a term coined by Southern California strawberry growers, who have been using the film to keep ripening berries from coming into contact with moist ground. Reduction in mold rot and disease, in effect, is estimated to increase the marketable yield by a third; and the film also acts as a blanket to keep the soil warmer. Dr. Staff reports that this additional heat in the early spring forces plants to early maturity, so that berries grown under film appear on the market weeks before unmulched berries.

The primary functions of any mulch are to keep soil around plants soft and moist, to curtail weed growth and to protect produce from rotting. Film made from polyethylene is well suited for these jobs, because it is resistant to moisture and agricultural chemicals. The strong, flexible black film, which closely fits the contours of the ground, prevents driving rains from compacting the soil. At the same time, it holds soil moisture near the plant roots but prevents it from evaporating. Soil under a film mulch remains soft and moist.

Since water does not evaporate through the film, irrigation needs to be performed only during prolonged dry spells. When irrigation is necessary, small slits cut in the film between rows or plants allows water and soluble fertilizer to penetrate to the plant roots. Tests have shown that there is more even distribution of water and fertilizer under the film than in open ground and a considerable increase in nitrification.

Polyethylene silos are permitting storage of winter feed for animals in convenient spots around the farm. This particular one is a large open-end sleeve made of Krene plastic, and is drawn over a silage form, which has been made by packing a snowfence form with the silage.

...on his way

to solve your formulation problems!

If water hardness, creaming rate, oil break, flash dispersion, or cost is troubling you, let our laboratories bring their experience to bear on the problem. Literally hundreds of such problems have been presented to us; to many of them successful solutions were found.

As manufacturers of AGRIMUL® 70A, one of the leading agricultural emulsifiers, our technicians are familiar with all phases of the agricultural pesticide industry and are ready to go to work for you.

Backing our laboratory is Nopco's half century of emulsion technology and surfactant manufacturing experience, from which many complex problems have been resolved.

We extend to you our invitation to take advantage of our technical background, our technical laboratory facilities; and if direct contact is desired, to get in touch with our Mr. Arthur M. Gladstone, Technical Manager. Nopco Chemical Company, Harrison, New Jersey.

NOPCO

PLANTS: Harrison, N. J.
Cedartown, Ga. • Richmond, Calif.
London, Canada

Dr. Staff reports that research conducted over the last three years by the Bakelite Co. and agricultural station researchers indicates that black film made from specially-formulated polyethylene shows practically no deterioration in the field. Tests indicate also that the same film can be left in place for several plantings provided care is taken during the initial laying to see that the edges are firmly held down with soil, as a precaution against wind damage.

Black film also cuts off light so that weeds smother under the film. Plants grow only where slits have been cut during planting. Weeding and cultivation are reportedly unnecessary except along the edges of the film, though an occasional weed will sprout through an irrigation slit. By eliminating weeding, the small plant roots which are so frequently broken during weeding are left intact. At present, Dr. Staff says, planting techniques using a corn jobber have been perfected only for transplants for large-seed vegetables such as corn, beans, or watermelons. Research is continuing on ways to sow small-seeds such as carrots.

"Mulches, are only one aspect of the developing agricultural trend," according to Dr. Staff. "Krene and film made from polyethylene can also be used to line irrigation ditches and farm ponds to make better use of available water supplies."

"Conservationists estimate that 30 to 60% of the water available for irrigation is now lost because of seepage. This loss can be, and is being, cut by lining ditches with plastic film. Opaque films appear to have the edge in this application because they also serve to prevent the growth of weeds."

A number of approaches have been tried in lining farm ponds with plastic films to prevent seepage. The easiest and quickest way is to lay a prefabricated liner like a huge backyard wading pool, but such a pond lining is subject to mechanical damage. Dr. Staff advises that soil should be backfilled over the liner to protect it from mechanical damage.

The building of commercial greenhouses using uncolored polyethylene film is also reported to have been successful. First costs have been as little as one twentieth the cost of a conventional structure with annual replacement of film reportedly no more expensive than the annual maintenance costs on a conventional greenhouse.

The greenhouse building technique has been recently extended to row crops in the fields. It has been found to be possible to protect crops from light frosts by laying a double layer of plastic film over wire wickets and anchoring the edges of the film strips firmly in the ground. The double layer of uncolored film provides a blanket of dead air that acts as insulation against severe frosts.

Dr. Staff mentions silage protection as another growing use for this multi-purpose film on the farm. "Large polyethylene tubes, 20 feet in diameter, make excellent temporary silos for surplus crops. These can be erected in any accessible spot on the farm to hold any amount of silage available at any one time. They are not designed to take the place of conventional farm buildings, merely to provide the farmer with an inexpensive way to store excess silage in good years."

On the open range, a study has been made of the possibility that opaque films might be stretched over rough frames to provide shelter for cattle. The film also can be used as insulation on chicken coops, sheds, and other inexpensive farm buildings which do not need year-round protection.

•

Mathieson Sets New Sales Mark

The Olin Mathieson Chemical Corp., New York, announced recently it had set new company records for sales and earnings for the quarter and six months ending June 30. Net income for the first half of 1956 was reported as $21,603,517, a rise of 8.3% above the $19,941,739 of the corresponding period last year. Domestic sales were up 11%, $300,050,408 this year as compared to $270,800,964 for the first six months of 1955.

"Sweepstakes" Contest Held

Fertilizer dealers from Kansas, Missouri, and Nebraska received top prizes in the recently completed "Fall Application Sweepstakes" of the Spencer Chemical Co., Kansas City. The contest, held as part of the company fall application sales campaign, drew over 900 entries.

First prize of an eight-day, expense-paid trip to Mexico for two was awarded to Charles Geiger, owner of the Farmer's Elevator, Ottawa, Kan. Oral Robinson, owner of the Robinson Elevator, Lathrop, Mo., won second prize. Third prize, a portable drill kit, went to Eldon Grove, manager of the Cadams Grain and Lumber Co., Cadams, Neb.

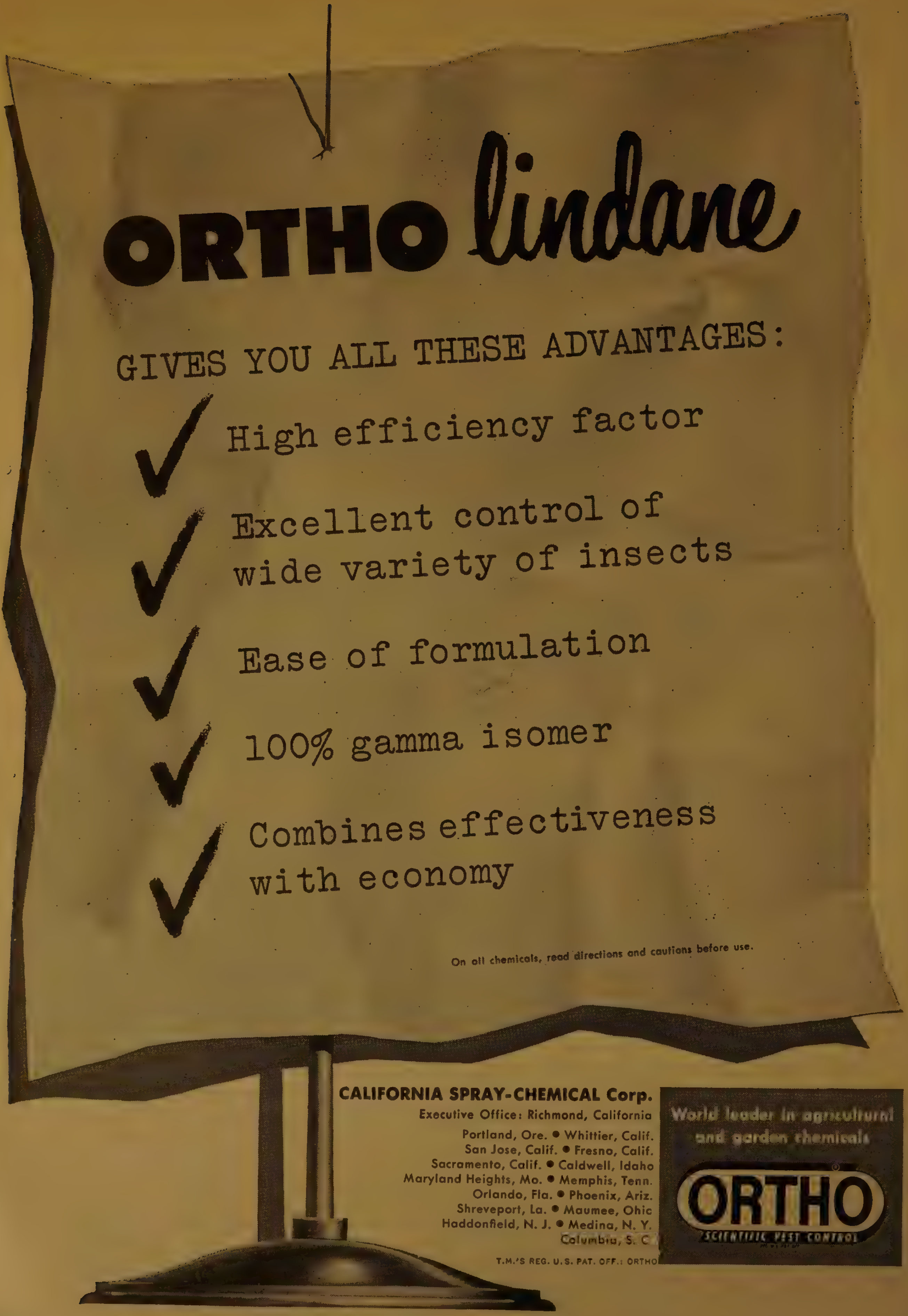
•

Fire Ant Outbreak in Ala.

The imported fire ant is reported to be increasing in southern Alabama. The report comes from G. H. Blake, Jr. in the Fall 1956 issue of Highlights of Agricultural Research, published at Auburn University.

Mr. Blake cites the fire ant as important for the following economic reasons: "(1) It frequently attacks germinating seed and young tender plants; (2) it builds unsightly mounds that can damage farm machinery; (3) it interferes with harvest of crops, and (4) its sting causes extreme irritation and may result in death. In fields planted to row crops, the ants sting persons harvesting such crops as strawberries and potatoes. The dried mounds can damage cutter bars of mowers and combines. Silage-harvesting machines and combines become clogged with the moist soil from the mounds to the extent that the machines must be stopped for cleaning. The ants attack the operators as they clean the machinery, often without provocation."

As a mound treatment Mr. Blake suggests chlordane as a 10% dust or a 2½% emulsion spray, though long lasting control of the imported fire ants was effected best by broadcasting chlordane, dieldrin or heptachlor in infested areas. As a good way of applying the insecticides, it is recommended that they be applied with the fertilizer in late winter or early spring.



ORTHO lindane

GIVES YOU ALL THESE ADVANTAGES:

- ✓ High efficiency factor
- ✓ Excellent control of wide variety of insects
- ✓ Ease of formulation
- ✓ 100% gamma isomer
- ✓ Combines effectiveness with economy

On all chemicals, read directions and cautions before use.

CALIFORNIA SPRAY-CHEMICAL Corp.
Executive Office: Richmond, California
Portland, Ore. • Whittier, Calif.
San Jose, Calif. • Fresno, Calif.
Sacramento, Calif. • Caldwell, Idaho
Maryland Heights, Mo. • Memphis, Tenn.
Orlando, Fla. • Phoenix, Ariz.
Shreveport, La. • Maumee, Ohio
Haddonfield, N. J. • Medina, N. Y.
Columbia, S. C.

T.M.'S REG. U.S. PAT. OFF.: ORTHO

World leader in agricultural and garden chemicals

ORTHO
SCIENTIFIC PEST CONTROL

Meyer Opens Omaha Office

A new sales office has been opened in Omaha, Nebraska, by Wilson & Geo. Meyer & Co. Intermountain, exclusive sales agents for the recently expanded 150,000-ton annual output of phosphatic plant foods produced by Western Phosphates, Inc., at Garfield, Utah. The new office, located at 140 South 40th Street, Omaha, is in charge of John J. Portz, who previously was connected with Lincoln Service and Supply, Inc.

•

Name Williams To New Post

S. H. Williams, vice president of General Aniline & Film Corp., New York, has been named assistant general manager, Dyestuff and Chemical Division, effective Sept. 1. He had been general sales manager.

Mr. Williams has been with General Aniline for 28 years. In 1941 he became manager of the firm's Charlotte, N. C., branch, and in May 1952 was advanced to the position of general sales manager in the Dyestuff and Chemical Division. He was elected vice-president in 1954.

•

Sample Named Agronomist

The United States Testing Co., Hoboken, N. J., recently announced the appointment of William T. Sample as an agronomist in the firm's Memphis branch. He was formerly an agronomist for the Mid-South Chemical Corp., Memphis, and prior to that was an associated county agent with the Agricultural Extension Service of the University of Missouri.

•

Ralph Chipman Dies

Ralph N. Chipman, founder and former president of the Chipman Chemical Co., Bound Brook, N. J., and an authority on weed control, died late last month at the age of 70. From 1942 to his retirement last February he had been manager of the herbicide department of the General Chemical Division of Allied Chemical and Dye Corp., New York.

Mr. Chipman established the Atlas Preservative Co., in 1910; in 1917 he founded Chipman Chemical, and was its president and manager for 22 years.

He was first president and a charter member of the National Agricultural Chemicals Association, and a member of the board of the Manufacturing Chemists Association.

•

Announce New Trade Mark

As a result of the recent merger, the Union Bag-Camp Paper Corp., New York, last month announced the adoption of a new trade mark for its combined line of products. It is a simplified version of the Union Bag shield, with the first names of both companies appearing inside. It is reported that the trade mark has been designed specifically to capitalize on the prestige of both firms.

union
camp

•

Manley Jefferson L. Div. Head

The Jefferson Lake Sulphur Co., New Orleans, last month appointed Harold W. Manley manager of its newly-created oil and gas division. Mr. Manley was formerly vice-president of Barnsdall Oil Co. and later of Sunray Oil Co., before being an independent operator and later a consultant to the Jefferson Lake Co.

•

A-W Opens New Iowa Office

Ashcraft-Wilkinson Co., Atlanta, sales agents for Duval Sulphur & Potash Co., recently announced the opening of a new district sales office in the Insurance Exchange Building, Des Moines. It will be under the supervision of James S. Greene, and will serve the company's customers in the Dakotas, Colorado, Idaho, Iowa, Kansas, Minnesota, Missouri, and Nebraska.

Calif. Assn. Convention Set

Elmer Wheeler, of the Sizzle Ranch, Texas, a leading authority on sales management, will be the featured speaker at the 33rd annual convention of the California Fertilizer Association at the Hotel del Coronado, Calif., Nov. 11-13, it was announced early last month. An attendance of 600 from all over the U. S. and Canada is expected.

Mr. Wheeler, who originated many highly successful sales approaches in various businesses, will tell the plant food representatives about "Selling the Sizzle in the Fertilizer Business," a twist on his own "don't sell the steak, sell the sizzle." Theme of the convention will be "Some Aspects of Fertilizer Industry Economics," with the chief speaker to be Professor Philip Neff, director, industrial and governmental economics research, of the Planning Research Corp., Westwood, Calif. There will also be a panel discussion on the theme, moderated by Dr. Daniel G. Aldrich, Jr., chairman of the Dept. of Soils and Plant Nutrition, University of California, Davis.

Among the many social events planned for the convention are a special luncheon for the ladies at the La Jolla Beach and Tennis Club, golf tournaments for both men and women, putting contests, bowling, and cocktail parties and buffet suppers sponsored by some of the major chemical companies.

•

NE Weed Control Group

The eleventh annual meeting of the Northeastern Weed Control Conference will be held Jan. 10-12 at New York's Sheraton-McAlpin Hotel. The program, currently in the planning stage, will include discussions of weed control in such crops as corn, wheat, soybeans, pastures, vegetables, and orchards; weed control in lawns, golf courses, ponds, and streams; and for control of woody plants and weeds along highways, railroads, power lines, and around industrial plants. Dr. L. L. Danielson, plant physiologist at the Virginia Truck Experiment Station, Norfolk, is conference president this year.

Summit Mining Corporation's New Plant Where SER-X is Produced

For the past year Summit Mining Corporation has been processing Sericite ore at their new modern plant located in Aspers, Adams County, Pennsylvania.

SER-X, as the finished product is known to the industry, is a potassium hydrous alumina silicate of the following analysis: SiO_2 73.08%, Al_2O_3 13.70%, Fe_2O_3 3.12%, TiO_2 0.54%, CaO 0.30%, MgO 1.14%, NaO 0.22%, K_2O 5.42%, Ign. Loss 2.54%, Fusion Point Cone 12.

After the Sericite ore is processed, it has an average particle size of 3.5 microns and a bulk density of 40 pounds per cubic foot. SER-X is inert, non-hygroscopic and non shrinking. The particles are flat. Because of these physical and chemical properties the material has proved ideal for such industrial uses as a diluent in insecticide chemicals, and a filler in asphaltic compounds, joint cements, caulking compounds, etc., with other potential markets including paints, textiles, polishes, sealing compounds, and insulation materials.

Summit Mining Corporation had been using a small processing plant at Dillsburg, Pennsylvania for the initial milling of their ore. Upon the satisfactory approval by the market of their SER-X brand material and greater diversification of markets within a fast growing Company, it became necessary to build a new processing plant. The location was chosen near the ore properties and on a rail siding.

The management became interested in a new type disc roller mill which would insure greater quality control over their product, and also give them a greater yield per hour. This mill was purchased from the Hardinge Company and is the first mill of its kind in the United States. It has been so successful that another mill has been purchased and the Company has now doubled its capacity of air-floated material, and is turning out a purer, quality controlled product.

The plant was designed with the end purpose in mind of having as much flexibility within an operation of this kind as possible. It is located on the Reading Railroad where it can supply box or covered hopper cars with bagged material, consisting of 50 lb. or 70 lb. bags. Bulk material is conveyed from plant to hopper cars by air slides. The plant also has loading platforms for motor transports, and because of its proximity to the Eastern market can supply material by truck much faster than it can be delivered by rail in the smaller units, thus giving the customer more freedom of inventory space and requiring less "lead time" in purchasing.

Summit Mining Corporation are now shipping their Sericite material into sixteen states and four foreign countries. The future looks very good because of an intensive market research program consisting of technical development of both plant and product.

SUMMIT MINING CORPORATION

BASHORE BUILDING

CARLISLE, PENNSYLVANIA

To Conduct New Aphid Study

Cooperative studies of the spotted alfalfa aphid, one of the area's most serious insect pests, will continue at the Kansas agricultural experiment station with an additional grant of $5000 from the Agricultural Research Service of the U. S. Department of Agriculture. A similar grant was received last year.

The aphid is the state's newest insect pest, and caused serious destruction to alfalfa in southeastern Kansas this spring. Since that time, the aphids have spread over most of Kansas, and three separate studies are being conducted at various experiment stations.

Michigan Plans New Labs.

The Michigan Chemical Corp., Saint Louis, Mich., recently announced an expansion of the company's research facilities, consisting of a series of new laboratories for research and production control of products and processes of the company's rare earths business. The expansion plans have developed from the firm's pilot plant work and a number of years of research.

St. Regis Rerganizes Sales

The St. Regis Paper Co., New York, announced recently several personnel changes in the Eastern and Midwestern districts of its Multiwall Packaging Division. W. H. Versfelt, Jr., and W. T. Orr have been named regional sales managers in the Eastern district and will have their headquarters in the New York office. Mr. Versfelt will supervise branch offices at Ocala, Fla.; Atlanta; Baltimore, and part of New York metropolitan sales. Mr. Orr will supervise branch offices at Allentown, Pa., Buffalo, and Boston, and part of New York sales.

H. W. Walker was named regional sales manager of the eastern area of the Midwestern district, consisting of Detroit, Cleveland, Pittsburgh, Cincinnati, and Louisville, with headquarters in Chicago. W. A. Harris was named sales supervisor for the Chicago area.

In other changes, L. E. Gjovig was named manager of engineering for the consolidated Eastern district, R. P. Quinlan branch manager at Louisville, C. E. Freeman branch manager in Dallas, and D. H. Hundley branch manager in St. Louis.

Potash Co. Elects Hall

The Potash Co. of America, Carlsbad, N.M., recently announced the election of John W. Hall, company vice-president, as a director and member of the executive committee. In both positions he succeeds George E. Pettit, who died June 9.

John W. Hall

Newly elected director and member of executive committee.

With the report of Mr. Hall's election the board of directors announced that earnings for the first half of 1956 would be about equal to those of the similar period last year, in spite of drought conditions which depressed the market for fertilizers.

Carbide Moves N. Y. Office

Carbide and Carbon Chemicals Co., a division of Union Carbide and Carbon Corp., has moved its New York district sales office to 100 East 42nd Street, New York 17. The telephone number has been changed to MUrray Hill 6-5100.

Entomologists From Mexico

Two scientists from Mexico are currently studying entomology at Kansas State College, under sponsorship of the Rockefeller Foundation. Rodolfo Quintana, a graduate of the agricultural college at Juarez, Mex., is working on a special research project on factors influencing fumigation of grain insects. The other, Juan Antonio Sifuentes, a graduate of the agricultural college at Saltillo, Mex., is working on a study of host plant resistance to insects. Both men are associated with the Rockefeller Foundation's work on entomological problems at the agricultural college at Chipingo, Mex.

USDA Yearbook Published

The 1956 Yearbook of Agriculture, titled *Animal Diseases*, was published early last month. It contains 134 chapters by leading veterinarians and other scientists, most of them from the USDA and state colleges and experimental stations. Diseases and parasites of cattle, swine, sheep, goats, poultry, horses, mules, and other domestic animals and pets are emphasized, with a detailed description of causes, symptoms, treatment, management, and modes of transmission.

Copies may be purchased at $2 each from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Warning Label Book Issued

Warning Labels, A Guide for the Preparation of Warning Labels for Hazardous Chemicals — Manual L-1 is currently being distributed by the Manufacturing Chemists' Association, 1625 Eye Street, N.W., Washington 6, D. C., as an aid "to achieving uniform and more adequate labeling of hazardous chemical products." This fourth edition of the manual was prepared by the Labels and Precautionary Committee of the MCA, and is available at $1 per copy at the association's Washington offices.

The book is widely consulted by federal and state agencies, and by manufacturers using chemicals in their products. Its principles of precautionary labeling have been approved by the U. S. Public Health Service. The preface to the publication points out that "The warning labels suggested in this manual should be used in addition to, or in combination with, any label required by law."

The manual is divided into three parts. Part I sets forth principles for the preparation of warning labels. Part II contains suggested warning labels for specific chemicals illustrative of the application of the principles. Part III contains suggested warning labels showing the application of the principles to a group of chemical products used in the pesticide field. There is also included a glossary of terms used in the manual.

The Man from St. Regis offers a *pocketful* of savings with Pasted Valve Fertilizer Bags!

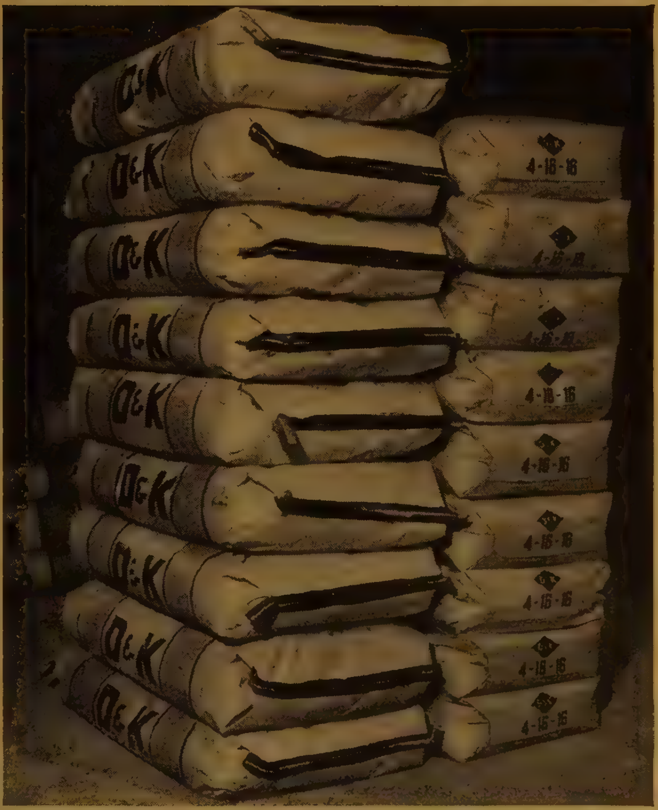
The St. Regis Pasted Valve Bag has a revolutionary moisture-tight, squared corner construction that saves you space . . . time . . . money!

Here's proof from Superintendent W. N. Brinson of Kingsbury & Co., Inc., Indianapolis, Ind. . . .

SAVINGS ONE — Saves Space! "We have gained storage space by changing to pasted valve bags . . . they are much easier to stack, making for better handling and storage in the warehouse."

SAVINGS TWO — Saves Time! "Fork lift trucks that handled only 15 bags per tier now handle 20 efficiently . . . dealers can identify grade analyses of warehouse stacks much quicker."

SAVINGS THREE — Saves Money! "The insert sleeve, combined with the tighter, better-shaped package, greatly reduces siftage. We get much less siftage than with sewn bags." Says Vice President Edward Kingsbury . . ."We've reduced package size and are happy with the storage savings. But *we like the lower* cost for bags, too!"



This is an un-retouched photo of new Pasted Valve Fertilizer Bags (at right) stacked next to conventional sewn-type bags in the Kingsbury plant. Holding the same amount of fertilizer, the Pasted Valve Bags take up considerably less storage space than ordinary sewn bags.

Behind the Man from St. Regis stand experts in every field of packaging, ready to serve you.

ST. REGIS PAPER COMPANY

Send in this coupon today. Find out how you can save space . . . time . . . and money in your plant.

Multiwall Packaging Division
St. Regis Paper Company, Dept. AC-956
150 East 42nd Street
New York 17, N. Y.

Please send me information about the new Pasted Valve Fertilizer Bag.

Name____________________ Title__________

Firm______________________________

Address___________________________

City____________________ State__________

VITREA CUSTOMERS ARE SATISFIED CUSTOMERS

because Vitrea means:

- ✓ Fewer bags to handle and store—45% N
- ✓ Quick acting, yet longer lasting UREA NITROGEN
- ✓ Dust free, free flowing pellets
- ✓ All-purpose nitrogen . . . ideal for fall plow-down and top dressing
- ✓ Highest yields . . . and profits

Stock up NOW with high quality JOHN DEERE VITREA.

JOHN DEERE

Grand River Chemical Division of
DEERE & COMPANY
2010 SOUTH UTICA • TULSA, OKLAHOMA

US Testing Opens Soils Lab

The United States Testing Co. recently announced the opening of an Analytical Soils Laboratory in the Cotton Exchange Building, Memphis. The laboratory is staffed and equipped to run routine analyses on soils to determine requirements for fertilizers, and also to undertake special studies on trace elements in soils. According to the report, more than usual emphasis will be placed on interpretations of findings and recommendations for fertilizer requirements.

●

Ammonia Tolerance Lifted

Ammonia used after harvest on oranges, lemons, and grapefruit has been exempted from residue tolerance requirements of the Miller pesticide law, the Food and Drug Administration announced last month. At the same time, the agency approved a tolerance of 110 parts per million for diphenyl when applied as a post-harvest treatment on these same citrus crops.

Further exemptions from tolerance requirements were granted for carbon tetrachloride, carbon disulfide, ethylene dichloride, and the organic residues of ethylene dibromide. For residues of inorganic bromides of ethylene dibromide used in fumigation of grains, a tolerance of 50 parts per million was approved. For residues of DDT in or on sweet potatoes, a tolerance of seven parts per million was approved.

American Cyanamid Co., New York, filed a petition with the FDA proposing a tolerance of eight parts per million for residues of malathion on certain raw agricultural products, a tolerance of 0.4 parts per million in milk, and of four parts per million in meat, fowl, and chicken eggs.

●

Complete Korean Shipment

A $900,000 order for superphosphate was completed last month with the final shipment of 9,700 tons of ammoniated superphosphate aboard the freighter "American Attorney," sailing from Savannah, Ga. The fertilizer was produced at the plants of Southern Phosphate and Fertilizer Co. and the Southern Fertilizer and Chemical Co.

Mathieson-Peru Research Program Directed by Cummings

A SPECIAL research program aimed at improving the quality and yield of various agricultural crops is being undertaken in Peru, it was reported recently by a leading U.S. agriculturist. The major centers of Peruvian agricultural research are the experiment stations at La Molina on the coast near Lima and Tingo Maria in Eastern Peru.

Dr. Elif Miller, chief agriculturist for the Chemicals International Division of Olin Mathieson Chemical Corp., New York, announced that his company will cooperate with government agencies there in a series of tests concerning disease and nutritional problems affecting cotton, rubber, tea, coffee, potatoes, cacao, and pasture lands. The work will be carried out mainly by the research stations of La Molina and Tingo Maria, both of which can already point to many achievements in horticulture, fertilization, disease control, and genetics.

The proposed work on use of chemicals will be under the general supervision of Dr. R. W. Cummings, chief of the Agricultural Research Mission in the Institute of Interamerican Affairs.

The experiments on fertilizers and fungicides in which Olin Mathieson is cooperating in Peru are part of a broad program of experiments in many countries established by Dr. Miller as the result of a recent tour in which he surveyed soil and crop conditions in several South American countries.

Discussing problems of plant diseases in Peru, Dr. Miller points out that even on the desert coast there is a serious "damping-off" disease on seedling cotton which makes necessary fungicidal seed treatment in order to get good stands. Dr. Victor A. Revilla, who has devoted considerable work to the damping-off disease *(Rhizoctonia)* is also engaged in experiments on controls for *Verticillium* wilt and black-arm, at La Molina and Piura respectively. Tests will be made with Omadine-Terraclor combinations for treatment of seed and soil

The fungus causing the chief damage to Peruvian potatoes is "late blight," caused by the organism *Phytophthora infestans.* New foliar fungicides will be tried on potatoes. Also, demonstrations of the use of high-analysis fertilizers for potatoes will be directed by Mr. George Boyd of S.C.I.P.A., with trials being made on the coast, at Cuzco, and at other potato production centers in the Sierra.

Dr. J. E. Wille, entomologist at the La Molina Station, who is in charge of Nematode experiments, believes that this pest is a basic cause of Wilt infection and hopes to improve controls through the use of a nematicide, such as Nemagon.

Other experiments with weed killers, fungicides and fertilizers for rubber, tea, coffee, cacao and pastures are in the planning stages and will be coordinated by Dr. Frank Hassis of the U.S. Research Mission, located at the Tingo Maria Station in Peru.

superior grinding equipment since 1891

BRADLEY PNEUMATIC HERCULES MILL

Provides a uniform grind from 20 to 325 mesh. Floor level installation provides easy accessibility . . . lowest installation and maintenance costs. Durable, non-clogging vibratory feeder for dependable, worry-free operation . . . even on material with some amount of moisture.

for Fine grinding of limestone phosphate rocks, etc.

for Semi-fine grinding of agricultural limestone

BRADLEY HERCULES MILL

From rough to finish in one low-cost operation. Automatic electric feed control eliminates manual operation. Rugged, dustless construction, maximum accessibility, keep maintenance costs at an absolute minimum. In sizes to meet any requirements at moderate cost.

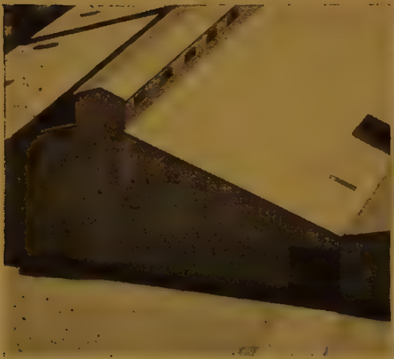
For complete information, write for catalogs No 61-62

Bradley PULVERIZER CO.

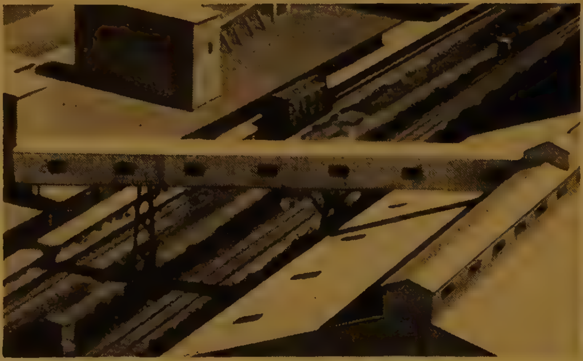
LONDON ALLENTOWN, PENNA. BOSTON

Can standardized structures meet the custom requirements of a complex fertilizer plant? The answer proved to be "Yes, emphatically!"

WHY DIXIE GUANO COMPANY CHOOSES LURIA BUILDINGS

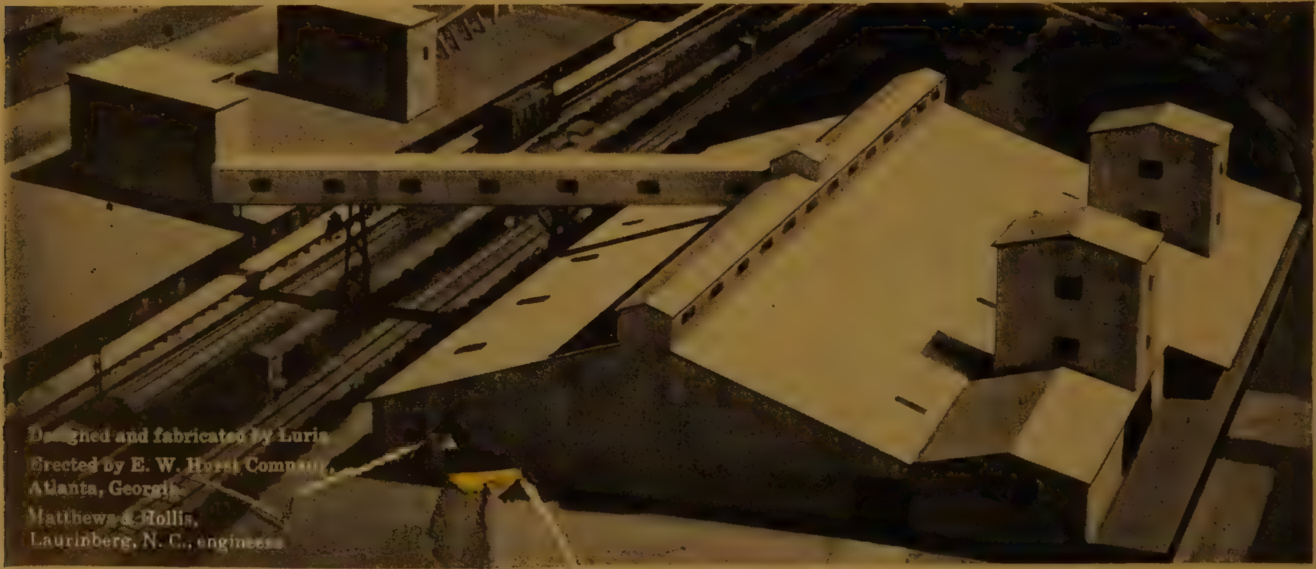


Bulk Storage Area with capacity of 12,000 tons of fertilizer can be filled during seasonal lulls by a single man.



Standardized Overhead Bridge by Luria contains conveyor belts that efficiently transport materials from the processing plant to the shipping center.

Multi-Story Buildups, adaptable to *individual* needs, house special processing machines.



Designed and fabricated by Luria
Erected by E. W. Hurst Company,
Atlanta, Georgia
Matthews & Hollis,
Laurinberg, N. C., engineers

> *Luria unites high speed, low cost construction with the special design requirements of custom building.*

"Customized" to your *individual* needs, "standardized" to bring speed and economy to your expansion program—these are just two of the many advantages provided by Luria structures.

The list of Luria customers in the commercial fertilizer field is as impressive as the list of Luria advantages. Contact your Luria representative—*you'll find that it pays!*

LURIA ENGINEERING Company
511 Fifth Avenue, New York 17, New York • Plant: BETHLEHEM, PENNSYLVANIA
District Offices: ATLANTA, PHILADELPHIA, BOSTON, CHICAGO, WASHINGTON, D. C.

Brea Wins Safety Award

Brea Chemicals, Inc., Los Angeles, a subsidiary of Union Oil Co. of California, recently was presented with the National Safety Council's "Award of Merit." This is the fifth safety award that the company has received in 1956, and was presented for the completion of more than a million man hours without a reportable injury. The record on which the award was made covered 932 calendar days and a total of 1,166,378 man hours, dating back to the start of company operations.

•

Conn. Field Day Held

Field Day visitors at the Mt. Carmel farm of the Connecticut Agricultural Experiment Station on August 15 were shown some of the techniques used in isolation and identification of many of the non-volatile substances in tobacco, and how these are being modified to help answer the question as to what gives a cigar a distinctive odor. Station biochemists also demonstrated a new shortcut method of curing.

Among the other exhibits were those relating to control of fruit, vegetable, and tree diseases, including illustrations of the effects of climate on the spread of plant disease.

•

Name Nielson To New Post

F. T. Nielson was recently appointed as development section supervisor on the production staff of International Minerals & Chemical Corp.'s Plant Food Division. He will be responsible for direction of the division's process development program, and will cooperate in the design of plant scale processing units.

Mr. Nielson's experience in plant food process development has included posts with the F. S. Royster Guano Co. as technical director, and with the Tennessee Valley Authority as a project leader for fertilizer development.

•

M. B. Gentry Dead

Martin B. Gentry, retired mining engineer and formerly a vice-president of the Freeport Sulphur Co., died recently in Southern Pines, N.C. He had retired from the Freeport Co. in 1949.

During his career Mr. Gentry served with several affiliates and subsidiaries of the Anaconda Copper Mining Co. He was also with the Solvay Process Co., a subsidiary of Allied Chemical & Dye Corp., the Beryllium Corp. of America, and the Union Sulphur Co. Inc., which is now Union Oil. He joined Freeport in 1935 as assistant to the president, becoming a vice-president in 1941.

Fertilizer Plant Completed

A multi-million dollar fertilizer plant was completed at Richmond, Calif., last month by the California Spray-Chemical Corp. Earlier in the month the company let a contract for the erection of an ammonium crystallizing unit with a capacity of 150 tons of ammonium sulfate per day.

The plant will produce chiefly light-colored crystalline ammonium sulfate, but will also manufacture various types of liquid fertilizer and blends in pelleted form.

DE-PESTER
THE DEPENDABLE BRAND

INSECTICIDES
Liquid and Dust Concentrates
Finished Dusts and Sprays
for the
Domestic and Export
Market

BHC
DDT
Toxaphene
Chlordane
Aldrin
Dieldrin
Endrin
Malathion
Parathion
Methyl Parathion
Sulphur

Liquid and Dry Fertilizers
Defoliants
Other Agricultural Chemicals

Experienced
Entomologists, Chemists & Plant Personnel

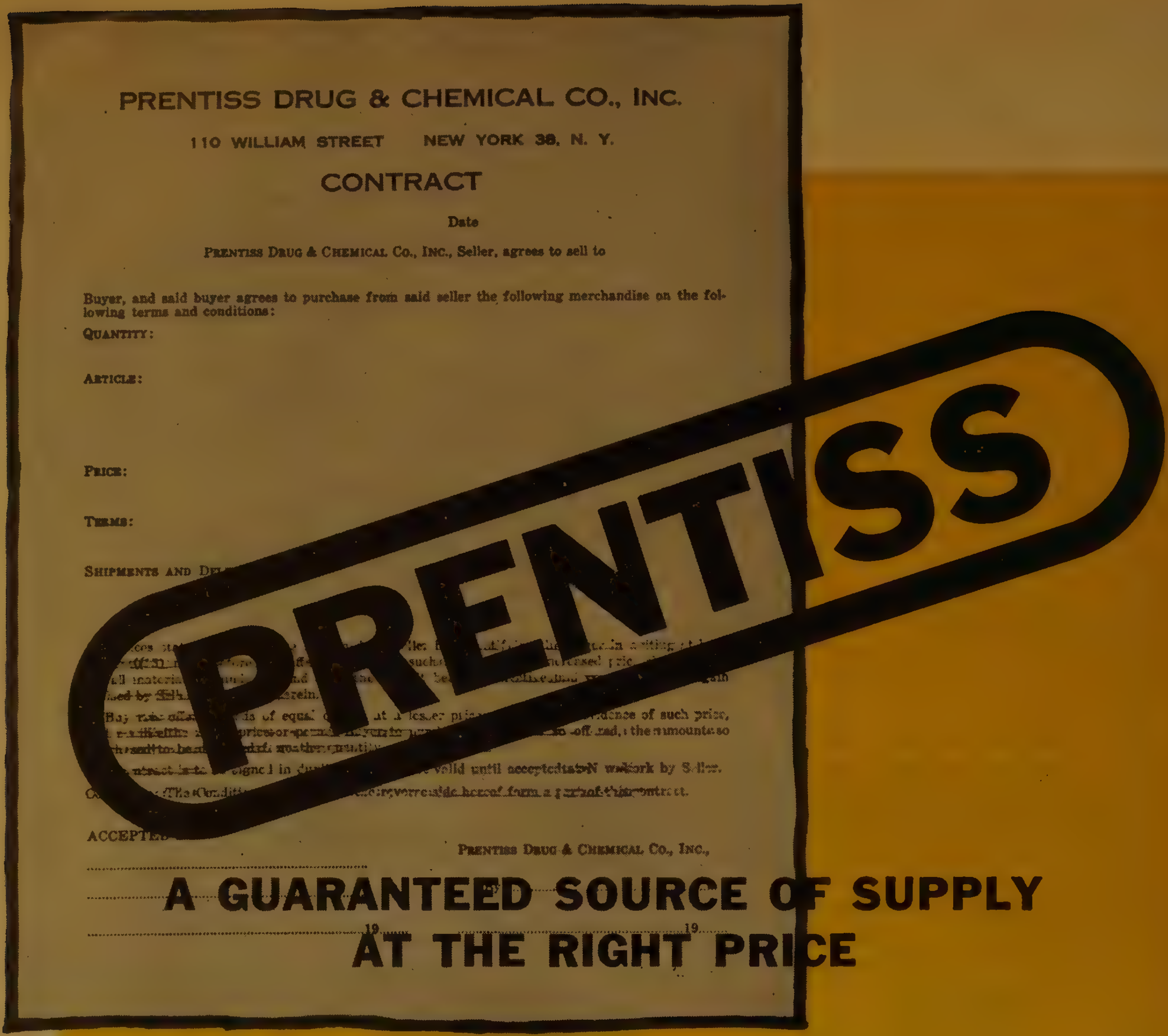
7 Modern Raymond Mills
14 Dust Blenders
6 Liquid Plants
in
Eleven Strategic Locations

Available for Custom Grinding, Blending,
and Processing

Agricultural Chemicals, Inc.

Plants Located: Batesville, College Station, Dallas, Henderson, Llano, Lubbock & Pecos, Texas; Natchitoches, Louisiana; Greenville, Mississippi; Lima, Peru; San Salvador, El Salvador, C. A.

MAIN OFFICE — P. O. BOX 398, LLANO, TEXAS
Phone 495



PRENTISS DRUG & CHEMICAL CO., INC.

110 WILLIAM STREET NEW YORK 38, N. Y.

CONTRACT

Date

PRENTISS DRUG & CHEMICAL CO., INC., Seller, agrees to sell to

Buyer, and said buyer agrees to purchase from said seller the following merchandise on the following terms and conditions:

QUANTITY:

ARTICLE:

PRICE:

TERMS:

SHIPMENTS AND DE[illegible]

[illegible]

ACCEPTE[illegible]

PRENTISS DRUG & CHEMICAL CO., INC.,

19 19

A GUARANTEED SOURCE OF SUPPLY AT THE RIGHT PRICE

With extensive manufacturing facilities and warehouse stocks in strategic locations throughout the United States, PRENTISS assures pesticide formulators of a steady and dependable source of supply for their necessary raw materials.

You are guaranteed raw material requirements when you want them, at the right price.

When contracting for next season's insecticides, think of PRENTISS dependability and remember —

PRENTISS IS THE INSECTICIDE MANUFACTURER THAT DOES NOT COMPETE WITH YOU!

Try these **PRENTOX** *Pest-tested products:*

- **ALLETHRIN**
- **CHLORDANE**
- **DDT**
- **LINDANE**
- **PYRETHRUM**
- **PYRONYL**
- **ROTENONE**
- **SABADILLA**
- **TOXAPHENE**
- **RAX POWDER** *(0.5% Warfarin)*

PRENTISS DRUG & CHEMICAL Co., Inc.
101 West 31st Street, New York 1, N. Y.
9 South Clinton Street, Chicago 6, Ill.

PRENTOX PRODUCTS FOR SALE TO MANUFACTURERS ONLY

USDA Researcher Dies

Glenn Briggs, a research agriculturist in charge of foreign technical assistance training programs with the U. S. Department of Agriculture, died last month in Washington. He had helped in the Department's fight against soil erosion in the Texas and Oklahoma dust bowls in 1935 and was the developer of a new grain sorghum.

Mr. Briggs worked for the USDA in Guam from 1917 to 1920, and returned to Oklahoma A & M, from which he had graduated in 1916, as a professor and research worker. He had been in the USDA's foreign training program since 1948.

•

Fulton Bag Elects Elsas

Clarence E. Elsas has been named executive vice-president of the Fulton Bag & Cotton Mills, Atlanta. At the same time, it was reported that Mr. Elsas will head the company's new Textile Division, a consolidation of its former Mills and Textile divisions.

Other appointments in the reorganization include: Fred G. Barnet, former St. Louis manager, Bag Division, as vice-president and general sales manager, Textile Division; and J. F. Green as general manager for textile manufacturing. To replace Mr. Barnet at St. Louis will be E. Monroe Hornsby, vice-president, who had been in charge of Fulton's New York office.

•

East Warned of Late Blight

The Federal-State Plant-Disease Warning Service at the Connecticut Agricultural Experiment Station, New Haven, last month warned Connecticut growers of potatoes and tomatoes that late blight might soon be found in that state. The warning came on the heels of the discovery that late blight of potatoes had been discovered in Pennsylvania and on Long Island. The researchers noted that the cool, wet summer is particularly favorable to spread of the blight.

In the past few years late blight has appeared in Connecticut but its spread was stopped by the usual hot, dry weather which followed.

Potato and tomato plants may be protected by spraying once a week with any one of the following materials: zineb, nabam plus zinc sulfate, maneb, Bordeaux, or any of the Standard copper-containing fungicides. Phygon may be used on tomatoes, but is not suggested for use on potatoes. The instructions for the use of these fungicides are given on their labels.

Spray Plane Crash in Fla.

Five men were killed early last month in the crash of a United-Heckathorn Co. C-82 Flying Boxcar near Boca Raton, Florida. The plane developed engine trouble on its way to Boca Raton to pick up insecticide for the company's spraying operation against the Mediterranean fruit fly, and shortly after crashed and burned.

The victims were: Charles W. Day, pilot; Ray F. Howrie, co-pilot; and John Tichner, Warren Rogers, and W. Johnson.

KOLKER
METHYL
BROMIDE

Now being produced at our modern plant in Newark, N.J., Kolker Methyl Bromide is the outstanding fumigant for the elimination of insect and rodent infestation of grain, tobacco plant beds, seeds, dried fruits, cereals, nursery stock and a wide variety of other products.

KOLKER METHYL BROMIDE

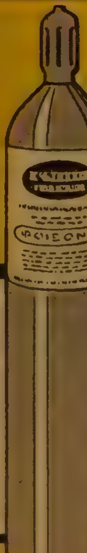
- Kills insects, mites and related pests in all stages of their development.
- Has a high degree of toxicity to a wide range of insects, rodents and other pests.
- Has rapid volatilization and a high rate of diffusion into stored grain, bales, packages and soil.
- Is non-explosive and non-flammable.
- Does not leave any residual odors, tastes or stains.
- Is economical to use.

Kolker Methyl Bromide is packaged in regular one-pound cans with 2% chloropicrin as warning agent, and 125, 150 and 450 pound cylinders of 100% methyl bromide.

Sale of Kolker Methyl Bromide will be handled by distributors throughout the country.

For further information on this highly effective fumigant, please call or write us today.

KOLKER CHEMICAL CORPORATION
600 Doremus Ave. · Newark 5, N. J. · MArket 2-4085



Plant Protection Conf. Discusses New Developments

By S. E. A. McCallan

THE Plant Protection Second International Conference sponsored by Plant Protection Ltd. a subsidiary of Imperial Chemical Industries Ltd. was held at London and Fernhurst Research Station on June 18 to 21, 1956. The inaugural luncheon at the Dorchester Hotel, London, was attended by about 300 delegates representing 42 different countries. The guest speaker was the Right Honourable R. A. Butler, Lord Privy Seal.

The scientific papers were presented at the Fernhurst Research Station in Surrey in large marquee tents admirably equipped, including loud speakers and numerous television sets for the projection of slides. The conference was organized into six sessions each dealing with a specific topic. An author had been invited to prepare a report on the particular topic and this paper had been submitted to the delegates ahead of the Conference. At the conference the author summarized his report. This was followed by two speakers who gave prepared addresses relating to the same general topic. The meeting was then opened for general discussion by the delegates and finally the proceedings were summarized by the chairman.

Dr. J. G. Knoll, of the F.A.O., was the author of the opening paper on "World Aspects of Plant Protection." In the session on "Genetics in Relation to Crop Protection" W. F. Hanna, Chief of the Division of Botany and Plant Pathology, Department of Agriculture, Canada, presented the main address. This was followed by comments by K. T. Suhorukov of the U.S.S.R. and R. L. Knight, East Malling, England.

Under "Mechanisms of Toxicity" S. E. A. McCallan, Boyce Thompson Institute, New York, dealt primarily with fungicides and pointed out that on the basis of actual toxic dose, even the most active fungicides are considerably less active than the most effective insecticides, herbicides and bactericides. J. T. Martin, Long Ashton, England, emphasized particularly the nature of pesticide deposits in relation to their toxicity while J. W. L. Beament, Cambridge University spoke on physio-chemical and physiological problems associated with the mechanisms of toxicity of insecticides.

"The Role of Systemics in Crop Protection" was covered by R. L. Metcalf, Riverside, California, as the author of the main paper and by P. W. Brian, Akers Research Laboratory, England, and E. Äberg of Uppsala, Sweden. Dr. Metcalf summed up the role of systemic insecticides in world agriculture, stressing especially commercial usage, selective insect control and residue problems. Dr. Brian dealt primarily with systemic fungicides and bactericides and Dr. Äberg with chemical weed control in Sweden.

A session was held on "Residual

SULPHUR AND CHEMICAL COMPANY
- POST OFFICE BOX 5737
- TAMPA 5, FLORIDA
- TELEPHONE 4-2177

After 6 years' Use Case Histories Show

You can *Lower* Granular Carrier Costs ...*Increase* Soil Insecticide Coverage with.

Terra-Lite®

BRAND

VERMICULITE

(NO. 4 SIZE)

- far more absorptive than other granular carriers...
- has over twice as many granules per pound...
- formulates rapidly...easy to handle...
- approved by toxicant manufacturers...

Formulators and farmers are daily proving: no other granular carrier compares with TERRA-LITE brand vermiculite. Weighs only 10 lbs. per cu. ft.! Other granular carriers weigh 25 to 35 lbs.! Amazingly absorptive; does not cake, even at high concentrations. And 27,500,000 particles per pound give Terra-Lite an amazing coverage in the field...in standard equipment every farmer owns! 50 pounds of 10% Aldrin on No. 4 Terra-Lite gives better coverage than 100 pounds of 5% Aldrin on other granular carriers. Excellent toxicant release. Yes, Terra-Lite has all the characteristics you are looking for. Here's the low-cost, free-flowing wide-coverage mineral you need to develop new business in the fast-growing granular field! Send for free sample and formulating instructions now!

LOW...LOW...LOW...Bulk Density

HIGH...HIGH...HIGH ABSORPTION

27,500,000
Granules per pound
Terra-Lite covers better.

•

Practically non-reactive.

•

Accepted by leading chemical manufacturers.
6 years of manufacturing and commercial use prove Terra-Lite's superiority.

•

Unlimited quantity from 40 plants.
Order from the plant near you —save on shipping.

Farmers get better coverage from
Terra-Lite multi-million particles·
carrying ALDRIN...HEPTACHLOR...
ENDRIN...DIELDRIN...
TOXAPHENE...D.D.T.
CHLORDANE...HERBICIDES

FORMULATORS Let us send you FREE inspection sample and formulating instructions. Terra-Lite is proving an ideal fertilizer-conditioner, too!

TERRA-LITE DIVISION
Zonolite Company, 135 So. LaSalle St.
Chicago 3, Illinois

MAIL COUPON *Now!*

Terra-Lite Division, Zonolite Company, Dept. AC-96
135 So. LaSalle St., Chicago 3, Illinois

Please send me free inspection sample of TERRA-LITE granular carrier and formulating instructions. Also send field studies on commercial use.

Name____________________________

Firm Name________________________

Address__________________________

City____________Zone______State________

DU PONT URAMON® Ammonia Liquors

are non-corrosive . . . easy on your equipment

This mild steel tank car has carried UAL for over 23 years!

UAL is easy and economical to use. It can be used in ordinary steel equipment.

The excellent conditioning effect of UAL gives mixed fertilizers better "feel". . . can often speed curing. And UAL minimizes dusting, segregation and setting of conventional fertilizer mixtures.

In granulation, too, UAL works well! Gives hard, uniform granules that are best for storage and application. If you're thinking of granulation in your future plans, ask us about UAL.

You'll like the on-time delivery of UAL. There are four formulations available. For technical assistance and information on the formulation best suited to your use, write Du Pont.

E. I. DU PONT DE NEMOURS & CO. (INC.)
Polychemicals Department, Wilmington 98, Delaware
1616 Walnut St.
Philadelphia 3, Pa.
7250 N. Cicero Ave.
Chicago 30, Ill.
Du Pont Company of Canada Limited
85 Eglinton Avenue East, Toronto 12, Ontario

URAMON®
AMMONIA LIQUORS

DU PONT
REG. U. S. PAT. OFF.
Better Things for Better Living . . . *through Chemistry*

Effects of Crop Protection Chemicals" in which J. M. Barnes, Medical Research Council, Carshalton, England, was the author of a paper dealing with the hazards arising from the use of toxic chemicals in agriculture. This was followed by a report from R. Truhaut, Faculte de Pharmacie, Paris, (in association with R. Fabre) and one on the residual effects of crop protection chemicals in the soil by F. J. D. Thomas, Merrindale Research Station, Victoria, Australia.

The final session dealt with "Applying Crop Protection Chemicals." R. P. Fraser, Department of Chemical Engineering, Imperial College of Science, London, presented a paper unusually well illustrated on the mechanics of producing sprays of different characteristics. There followed reports on mistblowing and mistblowers by E. W. B. van den Muijzenberg, Wageningen, Netherlands, and by R. C. Rainey, East African High Commission, on methods of insecticide application against the desert locust.

During the afternoon of June 21 there was an extensive demonstration of crop protection machinery at Fernhurst through the active cooperation of over twenty British machinery manufacturers. Previously the delegates had been shown over the superbly maintained 420-acre estate at Fernhurst which constitutes the main demonstration and research station for field trials of Plant Protection Ltd. Included on the estate are a fruit farm, market garden with 2 acres under glass, small dairy farm, a demonstration field for pesticides, a demonstration machinery center, and a 40-acre trial ground with a small orchard and hop garden. In addition to the departments concerned with the research and demonstration, Technical Service and Overseas Liaison are also stationed at Fernhurst.

On June 22 the delegates visited Jealott's Hill, Berkshire. This 500-acre estate is the agricultural research station of Imperial Chemical Industries Ltd. Preliminary screening and basic research are carried on here. The delegates were shown demonstrations or exhibits on the physical chemistry of the mode of action of pesticides; the analytical technical service; field experiments on manurial requirements, crop rotations and beef production trials; growth mechanisms in plants in relation to weed control and techniques for selecting active compounds with desired biological properties; and the influence of alternate husbandry on soil structure and nutrient losses by drainage. The activities of the Intelligence Section in providing information was explained. There was also demonstrated techniques used in studying the physiological action of insecticides and those employed in investigating the biological properties of experimental chemicals against red spider mites. In plant pathology, exhibits demonstrated the search for antifungal compounds freely mobile in the plant as well as for new protectant fungicides to control seed-borne and foliage diseases.

The delegates were impressed by the depth and scope of the activities.

TYPE 41 CLAY

In making organic concentrates using benzene hexachloride, chlordane, toxaphene, and other similar materials, it is important to have the concentrates free flowing.

TYPE 41 Clay can be combined with more costly diluents, such as Fuller's earth, and the result will be a free-flowing concentrate, at a lower cost to the producer.

TYPE 41 Clay has the following advantages:

NON ABRASIVENESS
FINE PARTICLE SIZE
ABSORBTIVENESS
PROPER BULK
HIGH INSECTICIDAL VALUE OF CLAY ITSELF
LOW PH VALUES
NO PHYTOTOXICITY TO PLANTS
OUTSTANDING ABILITY TO STICK TO THE LEAF

For Further Information or Samples Write to

SOUTHEASTERN
CLAY COMPANY
Aiken, South Carolina

MEETING CALENDAR

Sept. 5-7 — National Agricultural Chemicals Association, 23rd annual meeting, Essex and Sussex Hotel, Spring Lake, N. J.

Sept. 11-14 — Packaging Machinery & Materials Exposition of 1956, Public Auditorium, Cleveland.

Sept. 18-19 — American Chemical Society, Atlantic City, N. J.

Sept. 18-19 — Chemicals in Food Production Symposium at the national meeting of the American Chemical Society, Atlantic City, N. J.

Sept. 27-29 — Florida Fruit & Vegetable Association, 13th convention, Hotel Fontainebleau, Miami Beach.

Oct. 4-5—Iowa Pest Control Association, Des Moines, Ia.

Oct. 9 — Western Agricultural Chemicals Association, Villa Hotel, San Mateo, Cal.

Oct. 14-15—International Sanitation Maintenance Show and Conf. City Coliseum, New York City

Oct. 15—Chemical Sales Clinic, Hotel Commodore, New York City

Oct. 16-17—National Nitrogen Solutions Assn., City Auditorium, Sioux City, Ia.

Oct. 16-18 — Fertilizer Industry Round Table, Shoreham Hotel, Park Room, Washington, D. C.

Oct. 16-18—Canadian Agricultural Chemicals Assoc., Sheraton Brock Hotel, Niagara Falls, Ontario, Canada.

Oct. 19—Control Officials Association, Shoreham Hotel, Washington, D. C.

Oct. 22-23 — Fertilizer Section, National Safety Council, La Salle Hotel, Chicago.

Oct. 23-24 — Pacific Northwest Garden Supply Trade Show, Shrine Auditorium, Portland, Ore.

Oct. 22-25—National Pest Control Association, Sheraton - Cadillac Hotel, Detroit, Mich.

Oct. 25 — Middle West Soil Improvement Committee, Sherman Hotel, Chicago, Ill.

Nov. 2—Fertilizer Industry Work Conference, Atlanta-Biltmore Hotel, Atlanta

Nov. 7-9 — Agricultural Ammonia Institute, Atlanta Biltmore Hotel, Atlanta, Ga.

Nov. 7-9 — Pacific Northwest Plant Food Association, Harrison Hot Springs Hotel, British Columbia.

Nov. 11-13—California Fertilizer Association, Coronado Hotel, Coronado, Calif.

Nov. 13-15 — New York State Insecticide and Fungicide Conference, 18th Annual Meeting, and Pesticide Application Equipment Conference, 9th annual meeting.

Nov. 18-20—Midwest Garden Show, Navy Pier, Chicago.

Nov. 19-20 — Entomological Society of America, Eastern Branch, Hotel Haddon Hall, Atlantic City, N. J.

Nov. 27-28—Indiana Fertilizer Conference. Memorial Union Building, Purdue University, Layette, Ind.

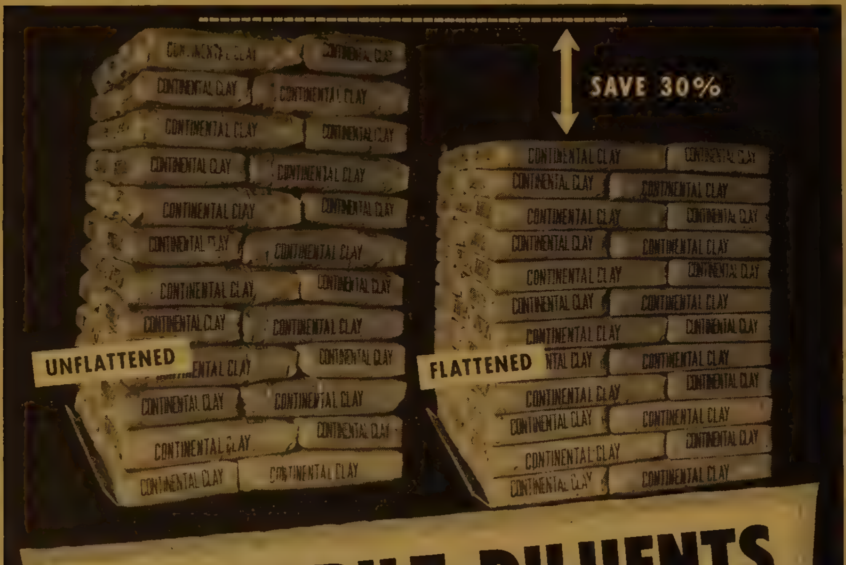
Dec. 10-12 — North Central Weed Control Conference, Sherman Hotel, Chicago.

Dec. 27-31 — Entomological Society of America, national meeting, Hotel New Yorker, New York City.

Jan. 10-12 — Northeastern Weed Control Conference, Sheraton-McAlpin Hotel, New York.

Jan. 13-15 — Garden Supply Show, Kingsbridge Armory, New York.

Jan. 23-25 — Southern Weed Conference, Bon Aire Hotel, Augusta, Ga.



VANDERBILT DILUENTS

save money – make money

LOWER STORAGE COSTS — FLATTENED BAGS SAVE SPACE
With Vanderbilt flattened bags, you store almost one-third more clay in the same space. The illustration shows Continental Clay but similar savings are possible with Pyrax ABB (pyrophyllite). You save on rent — cut down handling labor moving clays in and out of storage.

LOWER HANDLING COSTS — UNITIZED SHIPMENTS
It takes less time and fewer man-hours to unload and handle Vanderbilt unitized diluents. Units of about 3000 pounds are stacked on throw away fiberboard sheet. A special adhesive provides secure traveling but easy removal at time of use.

MORE SALES — NO DELAYS — RAPID SHIPMENT
Vanderbilt plants (Pyrax ABB from Robbins, N.C., and Continental Clay from Bath, S.C.) have the capacity to deliver without delay, even during the height of the season. Modern processing equipment assures prompt shipment on all orders. What's more, you can count on the same, uniform, high-quality diluents from shipment to shipment, season to season. There's no need to constantly adjust formulas — mixing is easier and quicker — dusts and sprays always have the same, full effectiveness.

Phone in a test order today — see for yourself how Vanderbilt clays save you time, money and worry.

free samples and Bulletin 23D on request.

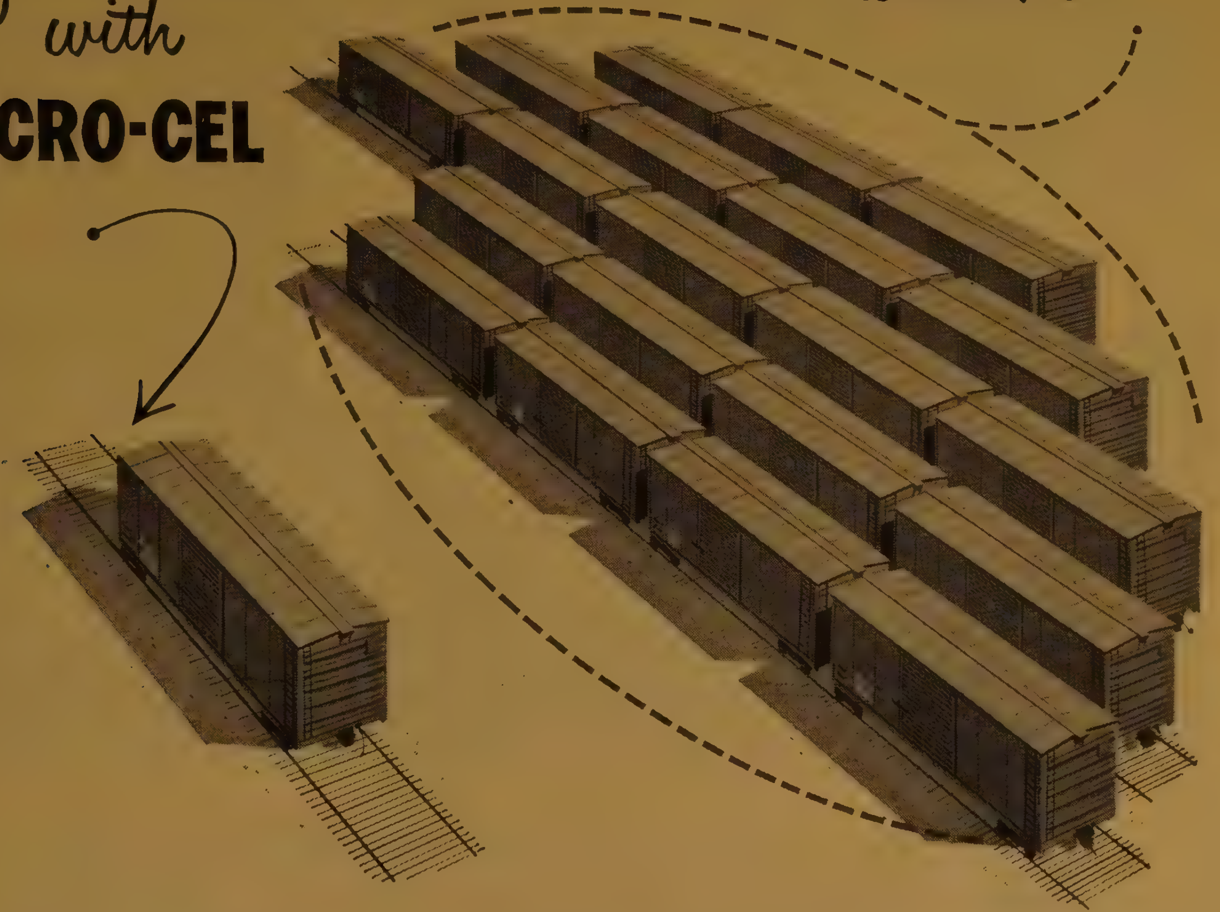
R. T. VANDERBILT CO.
SPECIALTIES DEPARTMENT
230 PARK AVE., NEW YORK 17, N. Y.

PHONE ORDERS
MUrray Hill 6-6864
New York

this shipment of 50% Heptachlor concentrate formulated with

MICRO-CEL

—can provide application quantities like this—



The advantages of formulating insecticide dusts at the higher concentrations obtainable with Micro-Cel* is graphically demonstrated by the freight cars above. One car of 50% Heptachlor when let down to a 2½% poison at the point of application produces the equivalent of 20 cars of insecticide in the field. Since Micro-Cel costs no more than many other diluents, the substantial freight savings mean extra profits for you.

PROVEN WITH MANY POISONS

Micro-Cel, a new line of synthetic calcium silicates developed by Johns-Manville, has been tested and proven at such high dust and wettable powder concentrates as:

75% DDT	**70% Toxaphene**
75% Aldrin	**75% Dieldrin**
50% Aramite	**50% Chlorodane**

Experiments with other poisons are under way today.

IMPROVES FLOWABILITY

Micro-Cel—"the powder that flows like a liquid"—reduces caking, increases flowability and gives more uniform coverage with dry dusts. Other important properties include large surface area, small particle size and high bulking action.

Ask your Celite engineer to help you adapt Micro-Cel to your particular requirements, or mail coupon below.

JOHNS-MANVILLE JM PRODUCTS

*Micro-Cel® is Johns-Manville's new absorbent-grinding aid designed specifically for the insecticide formulator.

Johns-Manville
MICRO-CEL
SYNTHETIC CALCIUM SILICATES
A PRODUCT OF THE CELITE DIVISION

Johns-Manville, Box 14, New York 16, N.Y.
In Canada: Port Credit, Ontario
Please send ☐ further information; ☐ samples of Micro-Cel. I am interested in using Micro-Cel with the following poisons:
____
☐ Please have your local representative contact me.
Name________________Position________
Company________________________
Address________________________
City____________Zone________State________

Poison Ivy Killer

The Connecticut Agricultural Experiment Station recently reported that a single application of a new poison ivy killer gave complete control of established ivy in an old orchard at the station's experimental farm at Mt. Carmel. The herbicide, amino triazole, killed the ivy immediately, and there was no new growth in 1956.

The herbicide was applied with a hand sprayer at three different rates, with and without a wetting agent. No comparisons among these treatments were possible because the lowest concentration used alone—¾ of a pound of active material to the acre — killed all the ivy. The researchers warn that amino triazole will turn foliage white where it hits apple leaves, and care should be taken to avoid this damage.

•

Los Angeles Co. Moves

The Los Angeles Chemical Co., a California producer of agricultural and industrial chemicals, recently moved to new headquarters at 4545 Ardine St., South Gate, Calif.

Malathion Mosquito Killer

Malathion is being used to control mosquito species which have become resistant to DDT and other chemicals, reports the American Cyanamid Co., New York manufacturer of the product. It has been given USDA acceptance for control of 90 farm, home and garden insect pests, and is presently being used over 660,000 acres in the salt marshes of Brevard County, Fla. Spray planes are applying malathion in diesel oil over all of the area to kill the mosquitos in one of their major breeding areas.

•

Blast Rocks BHC Plant

Two persons were killed and an estimated 20 injured early last month in a severe explosion at the Niagara Falls, N. Y., plant of the Olin Mathieson Chemical Corp. Company officials reported that the blast occurred in a plant making benzene hexachloride.

First estimates of damage were placed at $200,000, with equipment damage not yet fully determined. A fire swept the explosion area, and was brought under control some two hours later.

•

Specht Named M&C Head

Charles A. Specht was recently elected chairman of the executive committee and chief executive officer of the Minerals & Chemicals Corp. of America, New York. He was president of Pfizer International, Inc., and a director of Chas. Pfizer & Co., Inc. James Deshler remains as chairman and Wright W. Gary as president of Minerals & Chemicals.

•

French Process Licensed

Typpi O/Y Oulou Co., of Finland, was recently licensed by Potasse et Engrais Chimiques, a French agricultural chemical firm, to use its process for the manufacture of a daily production rate of 400 tons of high-grade fertilizer. The process is used also by the Gerwerkschaft Victor Castrop-Rauxel, Germany; Svenska Salpeterberken Koping, Sweden; and the Taiwan Fertilizer Co., Taipeh, Formosa.

Pyrophyllite is the ideal diluent and extender for agricultural insecticides

Insecticide Grade Pyrophyllite is the ideal diluent and conditioner for all types of insecticidal dusts. As it is non-hygroscopic, dusts compounded with Insecticide Grade Pyrophyllite will not absorb moisture. Nor is there any tendency even during extended storage, for the carrier to separate from the active ingredients.

Insecticide Grade Pyrophyllite has superior adhering properties, and because it is difficult to wet, it holds well on the plant leaves even during rain. When used as a carrier for products to be dusted by airplane, it settles rapidly, minimizing drift, waste of materials, etc.

Glendon's Insecticide Grade Pyrophyllite

Wt per cubic foot—30 lbs

92 to 95% will pass a 325 mesh screen

pH range of 6 to 7

Non-alkaline and chemically inert

Average particle size below 5 microns

Send for Testing Samples

GLENDON

Pyrophyllite Company

P. O. Box 2414
Greensboro, N. C.

Plant & Mines, Glendon, N. C.

an advantage when asking for the order

VERSENOL IRON CHELATE

VERSENOL IRON CHELATE overcomes iron starvation in all types of soil—puts a selling plus in your fertilizer!

Iron Chelates make soluble iron available to plants . . . preventing and correcting chlorosis due to iron deficiency. Many acres of nursery, citrus and truck crops have been treated with VERSENOL® IRON CHELATE with amazing results. Chlorosis disappears. Growth and yields are greatly increased. Appearance and quality are improved.

Customers realize the most convenient, most economical way to apply iron is in the fertilizer. They want VERSENOL IRON CHELATE—the first to perform well on both acid and alkaline soils. Add VERSENOL IRON CHELATE to your specialty formulas for extra sales-appeal and more profit!

Dow makes two formulations: VERSENOL IRON CHELATE and VERSENOL IRON CHELATE absorbed on Vermiculite for ease in mixing with dry fertilizer. Both are available in bulk packages. Your inquiry will bring complete information and prices. THE DOW CHEMICAL COMPANY, Midland, Michigan.

THE DOW CHEMICAL COMPANY
Agricultural Chemical Sales Department AG 152A-1
Midland, Michigan

☐ Please send literature
☐ Have technical representative call
I formulate fertilizer for:
☐ Citrus growers
☐ Truck gardeners
☐ Nurserymen
☐ Greenhouses
☐ Home trade
☐ Landscapers

NAME____________________
COMPANY____________________
ADDRESS____________________
CITY____________________
STATE____________________

you can depend on DOW AGRICULTURAL CHEMICALS

Announcing

3

New Services

Speaker's Manual — To assist you in preparing your talks

Safety Kit — To help develop your safe use program

Regulatory Surveys — To keep you abreast of Everchanging Laws

NATIONAL AGRICULTURAL CHEMICALS ASSOCIATION

1145 19th Street, N.W.
WASHINGTON 6, D. C.

Equipment AND BULLETINS

NPFI Distributes Ga. Poster

The National Plant Food Institute, in cooperation with the University of Georgia Agricultural Extension Service, recently began distribution of a 17 x 22-inch poster in two colors, emphasizing that in Georgia "High corn profits come *only* from well-fertilized fields." The poster recommends 4-12-12 plus nitrogen for higher yields and higher profits per acre.

Dr. Russell Coleman, executive vice-president of NPFI, reports that the poster was printed by the university from plates furnished by the institute and was distributed widely throughout the state through county agents and industry members "to help supplement the excellent soil fertility program being carried on by the Georgia Extension Service."

•

Shell Issues New Booklet

The Shell Chemical Corp., New York, last month issued a new illustrated booklet describing the uses for aldrin, dieldrin, endrin, D-D Soil Fumigant, Nemagon soil fumigant, and allyl alchohol. Entitled "Shell Agricultural Chemicals," the booklet also contains a master insect control list for the insecticides, and is illustrated with sketches and pictures of some of the leading crop pests.

•

Clarklift Brochure Out

Construction details, operating characteristics, and maintenance features of the new Clark line of fork-lifts are described in a 16-page brochure currently available from Clark Equipment Co., Industrial Truck Division, Battle Creek, Mich. Photographs and drawings help explain many of the line's engineering features, with a special section describing the operation of the power train.

The Clarklift's two separate braking systems are illustrated and accessibility characteristics are detailed. Also included is a list of the 34 major components.

•

New Bag Display Frame

The Bag Display Co., Hollywood, Fla., has begun marketing a newly developed "Expander Display Bag Frame" which it claims will simplfy display problems for fertilizer and insecticide dealers. The frame, consisting of interlocking steel-wire squares, reportedly gives display bags a tight, filled appearance without usually accompanying product weight.

•

Dorr-Oliver Leaflet

Dorr-Oliver Inc., Stamford, Conn. has made available a new two-page leaflet, "Dorr-Oliver Traveling Pan Filter," describing the features, operation, and sizes of this new type filter. Also included are a typical layout diagram and several equipment and installation photos for the filter, which is specifically designed for handling strong phosphoric acid. The filter was designed by Mario Giorgini, general manager of the D-O branch in Milan, Italy.

•

Minnesota Farm Booklet

The Minnesota Bankers Association, in cooperation with the University of Minnesota and the National Plant Food Institute, recently published a 20-page booklet on "Bigger Profits From Better Farming in Minnesota." The purpose of the book is to show how scientific farming increases farm profits.

Packaging Kit Available

A new "Do-It-Yourself" packaging work kit, designed to help fertilizer manufacturers figure complete bagging costs, has been made available by the Union Bag-Camp Paper Corp., New York 7. The kit contains tables for determining the labor costs per ton of material and per thousand bags at varying production rates. Also enclosed is a chart which figures cost of bag closing materials.

•

Bulletin on Systemics

The Connecticut Agricultural Experiment Station, New Haven, Conn., has just released a new 20-page bulletin reviewing use of "Systemic Insecticides to Control Mealybug, Scale, Aphids, and Cyclamen Mite on Ornamentals." It summarizes results in control of these pests with varying dilutions of Systox, Thimet, malathion, Endrin, Loro and compounds 12008 and G-22870.

Entomologist John C. Schread found that Systox and Thimet used once as soil drenches controlled mealybug on nephthytis, a plant from tropical Africa now grown extensively in greenhouses and as house plants. Two soil treatments with these materials or compound 12008 gave good control of the insect on Chinese evergreen.

Malathion sprays controlled mealybug on a lemon tree. Systox soil treatments controlled scale on nephthytis, but repeated applications injured the plants. Thimet, Systox, and compound 12008 gave good control of euonymus scale. Thimet and compound G-22870, used as soil drenches, gave complete control of aphids on chrysanthemum; Thimet and compound 12008 were effective against aphids on geranium.

Thimet, Systox, and compound 12008 controlled cyclamen mites on velvet-plant and ivy, with Systox the least effective of the three. Thimet was more effective than Systox in control of cyclamen mite on kalanchoe and cyclamen.

Copies of the circular, #200, are available without charge from Publications, The Connecticut Agricultural Experiment Station, Box 1106, New Haven 4, Connecticut.

NEWS FROM NAUGATUCK

DURASET-20W

increases Lima Bean yield

80% to 100%

Discovered by our research teams, DURASET*-20W, a new flower and fruit-setting hormone, was cooperatively developed with many state and federal experiment stations.

1. Increases yield—insures first pick
2. Gives more uniform bean maturity
3. Allows a continuous planting schedule
4. Insures continuous harvesting operations
5. Is easy to use

Tests on tomatoes, strawberries, peppers, apples and small seeded legumes show promising results with Duraset.

Order DURASET-20W from your local supplier today. Write, wire or phone us if unable to locate source of supply.

*U. S. Patent No. 2,556,665

SEE—Naugatuck Chemical Division, United States Rubber Company, at work on NBC's "Color Spread" TV spectacular, Sunday, March 25, 7:30 PM, EST.

US RUBBER

United States Rubber

Naugatuck Chemical Division

Naugatuck, Connecticut

producers of seed protectants, fungicides, miticides, insecticides, growth retardants, herbicides: Spergon, Phygon, Aramite, Synklor, MH, Alanap, Duraset.

Soil Testing Emphasized

The Iowa Bankers Association, in cooperation with Iowa State College and the National Plant Food Institute, has distributed 40,000 copies of a four-page folder emphasizing the importance of soil testing. It contains instructions on approved methods of taking soil samples.

•

Announce New Bag Type

A squared-off package which reportedly permits better pelletizing and improves the appearance of the container has been announced by the St. Regis Paper Co., New York. The length of the pasted "pallet bag" has been shortened for improved pallet loading, and the size of the gussets has been increased to obtain the same volume.

Siftage is prevented by a small sleeve and large valve, even though the width of the gussets is increased. After the bag is filled, it moves on a conveyor to a vibratory flattener which molds the square shape of the bag. The company reports that the squared shape also reduces slippage on the pallet load.

•

"Nutronite" New Trade Name

"Nutronite" will be the new trade name of "Smirow" tankage, the Smith-Rowland Co., Norfolk, Va., manufacturers of the nitrogenous tankage product, recently announced. The product is a natural organic water-soluble source of nitrogen, used chiefly by tobacco farmers and citrus growers. It is also recommended for direct application to lawns, and is specially marketed in 50-pound bags for that purpose by the Smith-Douglas Co., parent company of Smith-Rowland.

•

FEECO Granulation Unit

The Fertilizer Engineering & Equipment Co., Green Bay, Wis., recently published a leaflet describing its granulation unit, which it says boasts of a low initial cost, a minimum space requirement, and a simplicity of operation. The unit is equipped with a dust collecting system which reduces flue loss and recycles the collected dust back into the process.

NEWS Brevities

Colorado Fuel & Iron Co. and Monsanto Chemical Co. have announced plans to construct a liquid phosphate fertilizer plant adjacent to Colorado's steel manufacturing plant at Pueblo, Colorado.

AC

North American Cyanamid Co. announced construction plans for an anhydrous ammonia plant near the Dominion Foundries and Steel Co. smelter at Hamilton, Ontario.

AC

Elko Fertilizer Co., recently incorporated at Elkhorn, Wisc., for manufacture and sale of aqua ammonia and mixed fertilizer solutions. It lists 1250 shares of common stock.

AC

A New Potash Company to extract potash from the water of the Dead Sea will be set up soon in Jordan, according to a recent agreement by the governments of Jordan, Lebanon, Syria, Iraq, Saudi Arabia, and Egypt.

AC

Howard Hood has been appointed supervisor of safety by the Nitrogen Division, Allied Chemical & Dye Corp., South Point, O. division. He joined the division as an assistant chemist in 1953, and was promoted to chemist in 1954.

AC

The Export-Import Bank recently announced that it had granted credits of $151,400,000 to Brazil for a number of economic development projects, including new fertilizer production, grain, and cold storage facilities.

AC

Fulton Bag & Cotton Mills, New Orleans, recently announced the appointment of Peter H. Walmsley to the post of manager of the company's New Orleans branch. He succeeds Jason M. Elsas, Fulton vice-president, who will now devote his full time to his duties as vice-president and general manager of the company's national bag division operations.

AC

Stauffer Chemical Co's Chauncey, N.Y., Laboratory has announced the addition of Jack R. Gould, Harry Babad, Gert G. Eberhardt, Joseph R. Capecci, Jr., and Robert Clyne to its staff of technical personnel.

AC

Ivan C. Brooks was recently named to the research staff of S. B. Penick & Co., New York, as a research entomologist. He was formerly a consulting entomologist, and previous to that had been in charge of entomological research at the Diversey Corp., Chicago.

AC

Koehring Co., Milwaukee, manufacturer of heavy-duty construction equipment, appointed Donald C. Kilpatrick parts sales promotion manager.

AC

The International Harvester Co., Chicago, will temporarily halt production at four plants to bring inventories up to demand. Earlier the company had announced a five week halt in tractor production at two of its major plants.

AC

William I. Meyers, dean of the N.Y. State College of Agriculture, has been named a director in the Grand Union Co. He is chairman of the National Agricultural Advisory Commission and a member of the N.Y. State Commission on Agriculture.

IT'S HERE -
IT'S PROVEN

ITS Y-M CO'S. 500 LB. PORTABLE CUT-BACK DUST BLENDING SYSTEM

Capacity — Four to six 500 lb. batches per hour

Space Requirement — 6'6" x 10'6" x 15' O. A. Ht.

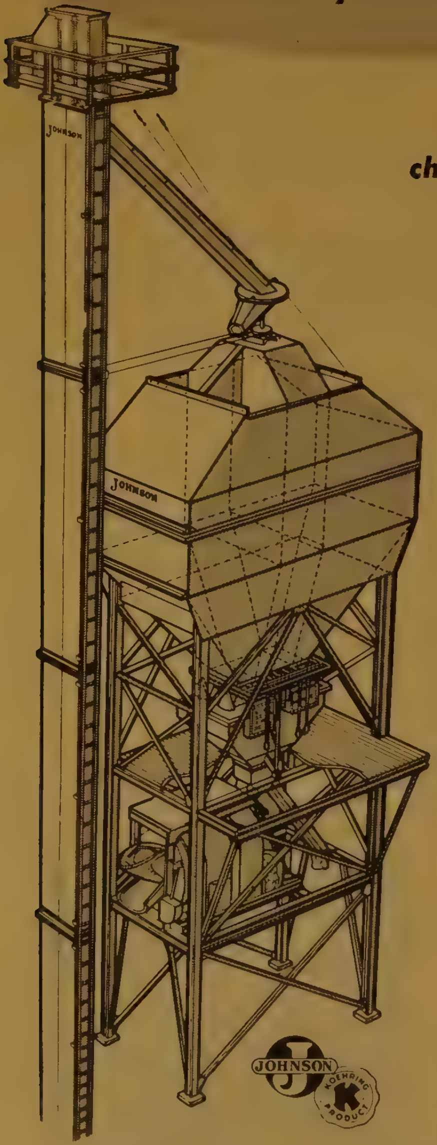
DELIVERED TO YOU—READY TO OPERATE
System Includes **— Dust hood at loading station; Sifter; Pre-Mixer at floor level; Pneumatic Conveyor-Blender; After-Mixer with dust collector; Dust hood at packaging station, etc; All motors wired to panel box with push button controls.**

WRITE OR PHONE
YOUNG MACHINERY CO.
MUNCY, PA. TODAY!

Young machinery

Muncy, Pennsylvania - - - - 6-3509
Pasadena 8, Cal. - - - - - - RYan 1-9373
Oakland 13, Cal. - - - - - TEmplebar 2-5391
Export Sales Reps.:
Mercantile Development, Inc.
50 Church St., New York 7 - - BArclay 7-4789

Batches, blends materials in one cycle of operation



check how this Johnson plant can be adapted to suit your requirements

- Arranged for manual or full automatic control, this Johnson fertilizer blending plant mechanizes all material-handling operations.
- It pulverizes, screens, batches, and blends materials in one continuous-flow operation.
- Enclosed bucket elevator feeds materials to top of the plant at a rate of 1,000 cu. ft. per hour.
- Clod breaker, with short belt conveyor, vibrating screen and collecting hopper can be installed between elevator head-section and overhead storage bin.
- Reject pipes can be added to automatically return oversize materials from the separating screen to elevator for re-sizing.
- Pivoted distributor directs flow of screened material from collecting hopper into storage bin.
- Johnson 100 to 200 cu. yd. Portable Section Bin, shown here, accommodates five materials — has four sections arranged around a central compartment.
- Bin feeds materials into a Johnson multiple-material weigh batcher, equipped with a 5,000-pound dial-head scale. Batcher accurately weighs up to five (or more) fine-grained materials.
- Solution weigh-batcher can be installed on the batcher platform.
- Mixer, for final blending operation can be installed on elevated platform, as shown, or at floor level to reduce plant height.

Owned and operated by leading fertilizer manufacturers, Johnson blending plants offer you a low-cost way to batch and blend materials to exact specifications. Whether you are interested in complete installations, or want to modernize existing facilities, check with us. All types, sizes of plants and auxiliary equipment available. Write today.

Mail to: C. S. JOHNSON CO. CHAMPAIGN, ILL. (Koehring Subsidiary)

☐ Send us more data on Johnson fertilizer blending plants. ☐ Have Johnson distributor call.

NAME .... TITLE ....
COMPANY .... DIV. ....
STREET ....
CITY .... STATE .... J547 AC

Also interested in: ☐ bulk phosphate plants ☐ aeration systems ☐ screw conveyors ☐ bucket elevators ☐ bins ☐ receiving hoppers ☐ batchers ☐ clamshell buckets

Dr. A. S. Hoyt, retired Director of Crops Regulatory Programs, USDA, recently became plant quarantine consultant for the Holland Bulb Export Association. In his new position he will assist the Dutch bulb industry in furthering good relations with the bulb industry of the U. S. and with plant quarantine officials.

AC

Commercial Solvents Corp., New York, recently named R. T. Thompson to its agricultural chemicals marketing and distribution organization in the Southeast. His sales responsibilities will be in Georgia and Alabama, with his headquarters at the company's Atlanta office. Mr. Thompson formerly was associated with the Agricultural Extension Service of the University of Georgia as a county agent.

AC

E. J. Sealey, who had been district salesman for the Wilmington, N.C. area, last month assumed the post of assistant division manager of the Armour Fertilizer Works in New Orleans.

AC

Valley Hill Chemical Corp., Jackson, Tenn. has begun installation of equipment at its fertilizer blending plant at Jackson. The Valley Hill plant will be able to process an estimated 125 tons per day.

AC

The California Spray-Chemical Corp., Richmond, Calif., recently honored and awarded service pins to three of its top executives. Leo R. Gardner, vice-president, director, and manager of the research and development department; and Howard J. Grady, vice-president and eastern regional manager of the marketing department, were awarded 30-year pins. R. W. Garrett, chief analyst, received a 25-year pin.

AC

Arthur L. Walker, Jr., assistant sales manager of the Texas Gulf Sulphur Co., New York, died last month. He was a member of the Mining and Metallurgical Society of America and the American Institute of Mining and Metallurgical Engineers.

Burris Products, Inc. was recently granted a charter of incorporation in Charleston, S. C., to manufacture insecticides, acids, and chemicals. A. A. Burris is president of the new corporation, which lists $100,000 common stock.

AC

Dr. Marshall O. Watkins recently became director of the University of Florida Agricultural Extension Service, succeeding H. G. Clayton, who retired after 39 years of service. Dr. Watkins had been assistant director since 1950.

AC

Leroy Rau was recently appointed by the Stauffer Chemical Co., New York. to handle sales of the complete line of chemicals of the company's Agricultural Chemical Division in its Midwest territory. He will make his headquarters at Stauffer's Omaha office, and will cover western N.D., S.D., Neb., southwest Wyo., and northeast Colo.

AC

The Richmond, Calif., plant of Stauffer Chemical Co., recently added Richard W. Davis, a chemist, and Fred Davenport, a chemical engineer, to its technical staff. Mr. Davis, who will be assigned to the plant's control laboratory, was formerly an analytical chemist for the Colgate-Palmolive and the Shell Oil companies.

AC

American Cyanamid Co., New York, last month released its new product, Amino Triazole Weedkiller, for use on Canada thistle. The announcement came after extensive testing of the product at agricultural colleges in states where the thistle is a problem. The company reports that amino triazole gave 90% or better control of the weed with one spray application, and that it may be used effectively after harvest.

AC

Stephen P. Kelly, New York sales manager for Tennessee Products Chemical Corp., Nashville, died recently.

AC

The Union Bag-Camp Paper Corp., New York, a corporation resulting from a merger of Union Bag & Paper Corp. and the Camp Manufacturing Co., early last month announced the purchase of the American Creosoting Co., Louisville, Ky., which specializes in the preservative treatment of railroad ties, fence posts, telegraph poles, etc.

AC

The Second Annual Weed Day at the N.Y. State College of Agriculture was attended by more than 100 representatives of industries dealing with herbicides. They were told that some chemicals look "particularly promising" when used in combination with cultivation. The field day was sponsored by the agronomy and vegetable crops departments at Cornell.

AC

Spencer Chemical Co., Kansas City, last month announced substantial increases in fourth quarter sales and earnings. Net sales in the three months ending June 30 amounted to $13,050,000, compared with $9,567,000 in the same quarter last year. The company reports that this increase was due mainly to increased sales of polyethylene.

Monsanto Chemical Co.s Inorganic Sales Dept., St. Louis, has announced the equalization of freight on ammonium nitrate with Hopewell, Va., Sheffield, Ala., and Savannah (Fort Wentworth) Ga. This applies on material shipped from Monsanto plants at Luling, La., and El Dorado, Ark.

AC

William W. Johnson has joined the Mississippi River Chemical Co., a division of the Mississippi River Fuel Corp., St. Louis, as technical service representative. Mr. Johnson had been with the American Nitrogen Co., Humboldt, Iowa.

AC

William A. Haigh recently joined the marketing staff of the Plant Food Division of the International Minerals & Chemical Corp., Chicago, and will have staff responsibility for the division's sales training program. Mr. Haigh had been associated with the Oliver Corp. as assistant advertising and sales promotion manager. In his new position he will also study distribution methods.

CHEMICALS
FOR AGRICULTURE

COPPER SULPHATE
Crystals Powdered
Basic Copper Sulphate

ZEE-N-O
Neutral Zinc 56% Zinc as metallic
The Highest Test Nutritional Zinc

MANGANO
Neutral Manganese 55% Manganese as metallic

W. R. E. ANDREWS SALES, INC.
1505 Race Street, Philadelphia 2, Pa.

Since 1926
Agricultural Chemical Specialists

BERKSHIRE
B C I
CHEMICALS
ISCO

SPECIALISTS

in

MAGNESIA

for

AGRICULTURE

EMJEO (80/82% Magnesium Sulphate) Calcined Brucite (fertilizer grade) 65% MgO

POTNIT

(95% Nitrate of Potash)
for
Special Mixtures and Soluble Fertilizers
Other Fertilizer Materials

Insecticides - Fungicides

Mercury Compounds
for Agricultural Use

DITHIOCARBAMATES

FERRIC — ZINC

EXPORT-IMPORT

BERKSHIRE CHEMICALS, INC.
420 LEXINGTON AVE. • NEW YORK 17
55 New Montgomery St. • San Francisco 5, Cal.
Innis Speiden Company Division
New York • Philadelphia • Boston • Cleveland
Chicago

Scots Building New Plant

Scottish Agricultural Industries Ltd. are in the process of building a new concentrated fertilizer plant at Leith, Scotland, in a combined project that will cost an estimated $8.5 million. The new plant includes three main process units, a formulation and granulation plant, and sulfuric and phosphoric acid production units. The cost also includes reconstruction of an existing S.A.I. fertilizer plant nearby.

Dorr-Oliver Inc., Stamford, Conn., designed the formulation and granulation plant, which will produce a variety of concentrated granular fertilizers using the American company's process. The process features the coating of muriate of potash, filler and recycled fines with relatively thin slurries of ammonium phosphate and ammonium sulfate. After granulation in a Dorrco "Blunger", the pellets are dried and screened, with oversize and undersize particles recycled.

The sulfuric acid unit began production last month, and construction of the two other units is nearing completion. All three plants are being built on 19 acres of land reclaimed from the Firth of Forth by the Leigh Dock Commission. Because of the plant's location with deepwater dock facilities, imported raw materials can be brought in directly by water.

•

Calif. Assn. Elects Three

The board of directors of the California Fertilizer Association, was brought to full strength recently with the election of three persons to fill existing vacancies. The new board members are Lowell W. Berry, president, Best Fertilizers Co., Oakland; Arthur W. Mohr, president, California Spray-Chemical Corp., Richmond; and John N. Williams, president, General Fertilizer and Supply Co., Chula Vista.

•

Escambia Changes Names

The Escambia Bay Chemical Corp., New York, recently discontinued the use of the word "Bay" in its official title to become the Escambia Chemical Corp. Research offices are in Cambridge and Newton, Mass.

1956 IN REVIEW

(From Page 42)

light demand occurred, with recurring shortages followed by oversupplies of our basic pesticides. This led to a near catastrophe for our industry about three years ago. Since then we have become a little more realistic and conservative in estimating our market. In addition, a number of producers with an uneconomic base position have discontinued production as have some formulators whose production costs were out of line. The current result is a saner approach to supplying and sharing this market.

As to the current position of our industry, there are many conflicting views. This, of course, is natural due to local conditions which may be exceptions to the overall outlook. In general, we entered this season with inventories of technical chemicals sufficient to meet consumer demand. Supplies of consumer formulations were adequate, but not excessive. Both technical and consumer formulations were of current production, as 1955 carry-over inventories had been small. Export requirments last fall and this spring prevented a buildup of excessive inventories.

A notable tendency during the spring season was dealer resistance to stock heavily, although consignment terms prevailed. Initial dealer stocks were smaller than usual, but adequate. When consumer demand started, manufacturers replenished dealer stocks as they were depleted. This placed manufacturers in better position to supply their customers on a regular basis from plant stocks and production to all points of demand. With the possible exception of several local situations, there have been no actual shortages this season. The average farmer had an adequate supply of insecticides when needed.

This year was a rather good one for the industry, price wise as well. Because beginning inventories had not been excessive, and infestations were moderate to heavy, modest profits were the general rule, and there will be a minimum of merchandise on hand for carry over to 1957.

With fall approaching, our thoughts turn to prospects for another year. We shall enter this new season with small inventories of both consumer formulations and technical chemicals. With producers continuing to manufacture at normal capacities, 1957 should be an even better year, if export and domestic demand continue at a normal rate. The pattern established this year suggests a healthy outlook for 1957.

Melvin E. Clark
Frontier Chemical Co.
Wichita, Kansas

THE uncertainties in agriculture make the prediction of pesticide sales a hazardous business at best. Therefore, it is an unusual pleasure to be able to review the season at this time of year and find one's predictions reasonably well borne out. Insofar as BHC is concerned, 1956 has been a good year. Reduced production rates plus low pre-season inventories tended to eliminate the over-supply which has plagued the market for several years. As a result, prices were firm, at a reasonable level, and supplies were adequate.

There was considerable speculation about possible shortages in the early part of the season; however, as it developed there was an ample supply of BHC to handle all requirements. The season cut off somewhat sooner than expected when shipments from producers dropped quite precipitously about August 1.

In some sectors, loss of control was reported toward the end of the season, which was due either to (1) a build-up of immunity to chlorinated hydrocarbons in boll weevils; or (2) "too little and too late" application.

The future of BHC and DDT in cotton dusting will be determined by experiments in the months to come. However, many believe that the low price and relative effectiveness of these insecticides will assure them a prominent place in growing cotton for some years to come, despite the fact that newer, more effective, and more expensive insecticides are being found regularly.

J. F. Hanley
Coop. Seed & Farm Supply Service
Richmond, Va.

THE use of agricultural pesticides through the territory which we service seemed to be normal during the 1956 growing season. In general, there was no need to exercise emergency control for specific insect problems. Farmers throughout our territory seem to be aware of the need for recommended spray programs. Following spray programs has made for a continual turnover in inventory of recommended pesticides, not only at the wholesale level, but also at the dealer level.

The application of various insecticides such as Malathion, Heptachlor, Methoxychlor, Endrin, Aldrin and TDE as a precautionary measure has given excellent control of insects infesting forage and tobacco crops. By following a well organized spray program, farmers have prevented infestations from building up to alarming proportions.

By following this procedure, much has been done also to keep prices stable. Throughout our operating territory prices were usually adhered to and we were not confronted with "price wars." Sporadic price breaks were encountered on several pesticides, but they were localized and did not affect the over-all price structure of any particular pesticide substantially.

There seems to be an increase in the use of the emulsion type sprays, with which excellent results are being obtained. The fine results have convinced many farmers that the use of agricultural pesticides is mandatory for the welfare of their business. Spray programs are being followed and most farmers are no longer waiting for infestations to build up and then needing material immediately.

The steady movement of pesticides throughout the past growing season has alleviated large carry-over of pesticides in warehouses. There weren't any emergency outbreaks and consequently, there wasn't any great demand for any two or three specific pesticides.

STEDMAN
FERTILIZER PLANT EQUIPMENT

Established in 1834

All Steel Self-Contained Fertilizer Mixing and Bagging Units
Complete Granulating Plants
Batch Mixers—Dry Batching
Pan Mixers—Wet Mixing
Tailings Pulverizers—Swing Hammer and Cage Type
Dust Weigh Hoppers
Vibrating Screens
Acid Weigh Scales
Belt Conveyors—Stationary and Shuttle Types
Batching Systems
Bucket Elevators
Hoppers and Chutes

STEDMAN FOUNDRY and MACHINE COMPANY, INC.
SUBSIDIARY OF UNITED ENGINEERING AND FOUNDRY COMPANY
General Office and Works — AURORA, INDIANA

The
MAGAZINE
for the
Manufacturer
of

pesticides
fertilizers
fungicides
herbicides
defoliants
fumigants

Agricultural Chemicals

offering practical features on manufacturing processes; techniques, developments . . . advantages, disadvantages, limitations, means of applications, technical and toxicological data on the agricultural chemicals; market information; merchandizing aids; survey data, etc. In addition, monthly features by industry experts on topics of current interest; reviews of technical literature; review of new industry products, equipment and bulletins . . . and news about the agricultural chemicals industry.

SUBSCRIPTION RATES

	1 Year	2 Years
United States	$3.00	$5.00
Canada and Pan Am. Countries	4.00	7.00
Other Foreign Countries	9.00	15.00

MEMBER
AUDIT
BUREAU
OF
CIRCULATIONS

AGRICULTURAL CHEMICALS

Caldwell, New Jersey

In general, the 1956 growing season was a good season from the standpoint of agricultural chemicals. All recommended pesticides gave excellent results in controlling the usual infestations found in our operating territory. Increased knowledge on the farmer's part relative to spray programs helped to keep recommended materials flowing from supplier, distributor and dealer to farmer. This procedure tends to keep prices firm at distributor, dealer and consumer levels. Recommended pesticides were used at normal levels, with no particular products showing unusual preference over others. Sales of agricultural pesticides showed an increase over the previous season, and inventories at the wholesale and retail level seem to be about normal.

P. S. Catir
Eastern States Farmers' Exchange
West Springfield, Massachusetts

AS was general throughout the Northeast, this cooperative was called upon to supply significantly smaller quantities of pesticides during the spring season as a direct result of adverse weather conditions which delayed development of crops and pests, through May. Since that time, however, monthly distribution figures have surpassed any previous June-July-August period. Consequently, the early season decrease in requirements has been fairly well offset by the increases of the past three months.

Eastern States is a cooperative purchasing agency serving more than 100,000 farmer-members in Pennsylvania, Maryland, Delaware and the 6 New England states. Supplies purchased by this cooperative are distributed to its members through 508 dealer level outlets, consisting of 417 local representatives and 91 regional warehouses, or in our terminology, "service centers." All of these units function as Eastern States dealers and all materials distributed to members must be through this dealer set-up. We believe that proper service to farmers can be best maintained by such a distributor - dealer - consumer structure. Consequently, we believe that the continued trend in the industry to by-pass the dealer function is an extremely unhealthy development for the industry as a whole, and for the farmer user. Operating margins and capital for research, expansion, etc. will naturally, in the long run, suffer from attempts by manufacturers to undergo a stretch-out of their function, attempting to deal directly with the grower.

In this same category of what we believe are destructive trends for the industry, is the mis-classification of many distributors and/or dealers who do not, in a realistic manner, perform the accepted distributor, or dealer, functions. In far too many instances in the northeast, there appear to be "distributors" without the usual pattern of dealers handling their materials, or "dealers" who are simply large growers performing no resale activity. Such problems, we realize, are not new in other parts of the country, but in the northeast this disturbing trend seems to be gaining in recent years.

General price levels, we believe, have been comparatively low during 1956, somewhat due to the late arrival of the actual usage season, but primarily due to the trends which we have mentioned previously.

P. J. Reno
Hercules Powder Company
Wilmington, Del.

1956 has been an exceptionally good year for the use of toxaphene insecticides. Sales started briskly early in the season, and continued to gain through late spring and summer. I would say that consumption of toxaphene is about 25 per cent above that of 1955, which was one of our better years.

During the past two years, particularly, we have noted a growing trend toward reliance on toxaphene in mid- and late-season, the periods of heavy boll weevil migration. This is in addition to our traditionally strong position in areas where early-season application of insecticides is advocated.

Recommendations for use of toxaphene have continued to grow steadily. In addition to its primary field of application on cotton, toxaphene is also used widely on a number of other crops. At the latest count, toxaphene was recommended for control of more than 200 different species of insect pests in the United States.

Looking ahead, for the balance of 1956 we anticipate the demand for toxaphene will be as great, or greater, than during the same period of 1955. As for stock carryover at the end of the year, indications are that it will be at a minimum figure as compared with past years.

George Simches
Planters Chemical Corp.
Norfolk, Va.

WE pesticide manufacturers and formulators, who offer products for sale in North Carolina, are either the most courageous or the most foolish business people known. In this particular area we are participating in a gamble the enormity of which makes the Irish Sweepstakes appear relatively insignificant.

To begin with, early season prices on the various pesticides used in this area, due to a very highly competitive situation, are very reasonable and carry the very minimum of profit margin. From early season on, it is catch-as-catch-can, Devil take the hindmost, as far as sound merchandising is concerned. In a well saturated market, with the supply always well ahead of demand, there are always suppliers who will sell a little cheaper. You are faced with the alternative of either meeting lower prices or having your customers buy from the lower man. One can well imagine the chaotic pattern of price fluctuations, all downward, and also of retroactive adjustments; all this on top of an exceedingly tight money and credit situation due to crop losses in the area caused by the severe hurricanes of August, 1955.

And now to get to the heart of this gamble — every item is sold on a "guaranteed sale" basis. Goods that remain unsold at the end of the season have to be picked up at seller's expense for return to seller's plant. The Irish Sweepstakes offers some lucrative prizes to the lucky few. What are the rewards of the travesty outlined above?

UNITED-Heckathorn

THE
3 have become 1

UNITED
CHEMICAL COMPANY

Heckathorn
AND COMPANY

UNITED
FERTILIZER CO.

Complete agricultural chemicals service, both domestic and export; custom grinding, formulating, packaging.

UNITED-HECKATHORN
600 South Fourth Street
Richmond, California

CONTACTS IN EVERY CORNER OF THE WORLD

Woodward & Dickerson Inc. serves you
with a long reputation for reliability in quality, price and delivery.

POTASH	NITROGEN
MURIATE	SULPHATE OF AMMONIA
SULPHATE	AMMONIUM NITRATE
NITRATE	CALCIUM AMMONIUM NITRATE
	UREA

AND ALL OTHER FERTILIZER AND FEED MATERIALS

ESTABLISHED 1873
Woodward & Dickerson Inc.

1400 SOUTH PENN SQUARE, PHILADELPHIA 2, PA., U.S.A.
TELEPHONE: LOcust 4-5600 Cable Address: "Woodward" TELETYPE: PH109

Branches in MADRID, MANILA, TOKYO, SEOUL, WASHINGTON, D. C., U. S. A.

They are dangerously low profits, if any; very low morale of everybody engaged in serving this particular area; the need of considerable extra warehouse space to handle the stream of returning goods; and lastly, a very poor customer relationship all the way down from manufacturer to distributor to dealer to farmer.

And the cure for all of this? A very difficult question to answer, but certainly a step in the right direction would be to firm up the definition of what constitutes a sale. Put pesticides on the same footing as thousands of other products flowing into our economy. Perhaps the best way to accomplish this would be by the complete elimination of consignments, from basic manufacturers and nationwide companies down to formulators. Then the laws of good management and sound economic planning might come to the forefront again, and everyone down to the dealer level would know what their responsibilities were with respect to purchasing inventories. The fundamental concept would be re-established, that *property* is something of value and not an intangible something that is on your books as a sale today and a credit for returned merchandise tomorrow.

Gambling has no place in the pesticide industry.★★

OPI MEETING

(*From Page* 53)

of scab on test trees was 0.1 percent or almost nil.

Always of great interest to the Ohio Pesticide Institute is the research work of C. R. Cutright, Ohio entomologist, with apple insect control. A test for the control of European red mite showed that Crag plus either DDT, lead or Ryanicide gave better results than Captan with the same additives. When lead was used with Crag as an additive, Mr. Cutright said the addition of lime as a buffer offset the effects of russetting.

A new feature added to the OPI program this year was a report on herbicide studies presented by E. K. Alban of the Ohio State University. Alban cited DNDSBP (Dow Premerge) as a good standard with which to compare other herbicides in the chemical control of weeds in snap beans. He suggests using this compound at 3 lbs. per acre. Simazin at ½ lb. per acre was outstanding.

Most all pre-emergence herbicides used on potatoes gave good results, Mr. Alban said. The LV ester of 2,4-D gives a leaf formation similar to DDT, and must be used in smaller amounts when this condition occurs. Neburon is a promising material for controlling grass in potatoes and may help solve the lay-by problem.

R. G. Hill, stone fruit specialist at the Station, gave recommendations for applying thinning sprays to peach trees, suggesting it be applied when a maximum crop is assured or about 30 days after bloom. Action of NAA, NAM and Chloro IPC is erratic, Hill reported.

OPI president M. G. Farleman presided at the annual banquet, while chief speaker for the occasion was Dr. W. E. Krauss, associate director of the Ohio Station. Mr. Krauss said that there is great need for a laboratory to simulate weather conditions for a study of plant disease control. He declared the time is ripe for more enthusiasm and action in the field of pesticide control.

The 1956 winter meeting of OPI will be held November 19 and 20 at the Neil House in Columbus, Ohio.

General chairman for the Wooster event was C. R. Neiswander, associate chairman of the Ohio Station's entomology department. Neiswander is also a director of OPI.★★

PESTICIDE PICTURE

(*From Page* 84)

Mississippi and Georgia, with heavier populations being noted in Alabama, North and South Carolina. Missouri continued light and a between brood decline was reported from Arkansas

DRYERS AMMONIATORS* GRANULATORS* ELEVATORS COOLERS CONVEYORS *for the Fertilizer Industry*

CONTINUOUS COMBINATION AMMONIATOR-GRANULATOR

One complete unit does the work of two. No need for individual ammoniator and separate granulator. Costs less . . . saves space . . . reduces operating expenses.

DEHYDRO-MAT DRYERS (*patented*) **AND COOLERS** (*pat. pending*)

Produce top quality fertilizers. Available in all sizes . . . especially suited for large capacities where floor space is limited.

Also Conventional Dryers and Coolers

*TVA Licensed Manufacturer

EDW. RENNEBURG & SONS CO.
Baltimore 24, Maryland, U.S.A.

Literature and information on request.

Be in business and MAKING MONEY

2 DAYS AFTER DELIVERY!

Complete R. T. R.* Plants for Fertilizer and Insecticide Production

Poulsen *Ready-To-Run Plants provide immediate, profitable production of concentrated or field strength insecticides and various fertilizers. All Poulsen R.T.R. Plants are fully tested at the factory before shipment and can be quickly and easily assembled for local operation.

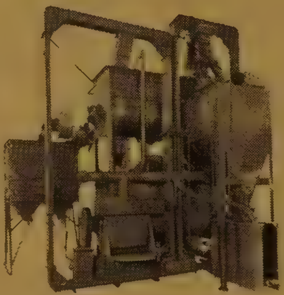
FERTILIZERS

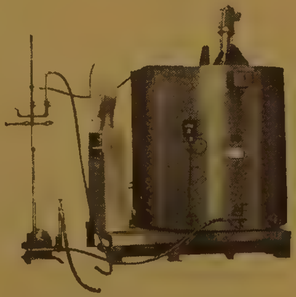
FERTILIZERS — Poulsen Company provides custom design, engineering and manufacturing of complete plants for producing various plant foods—either complex formulations or simple fertilizers — in unit sizes to suit your individual production requirements. Poulsen plants produce fertilizers which are free flowing and of superior quality, and allow complete control of nitrogen, phosphorus and potassium content.

- Fertilizer Mixing Plants
- Ammonium Phosphate Plants
- Nitric Phosphate Plants
- Triple Superphosphate Plants
- Single Superphosphate Plants
- Granulating Plants
- Ammonium Sulphate Plants
- Materials Handling Systems
- Other Complete Fertilizer Plants

INSECTICIDES

INSECTICIDES—Poulsen R.T.R. Uni-Blender is a small-space Insecticides production plant in one single unit. Dual model shown — mixes, blends and packages insecticide dusts in concentrated or field strength form, from ingredients requiring reduction in particle size or liquid impregnation.





Liquid toxicant measuring and blending tank is water jacketed with emersion heaters in the jacket; has replaceable inside stainless steel tank.

Write for new catalog and technical bulletins

POULSEN COMPANY
2341 East Eighth Street
Los Angeles 21, California

Pinpointed

to local needs

Every Stauffer Service Man is thoroughly versed in *local* problems!

His job is to help solve these difficulties, regardless of whether any of the complete line of Stauffer agricultural chemicals is directly concerned.

And behind every Stauffer Service Man is the Stauffer formulation know-how, to insure grower satisfaction and repeat business.

Why not investigate Stauffer now? We think you'll be impressed with what Stauffer has to offer.

Stauffer

CAPTAN

VAPAM

PARATHION

(Flowable and Wettable)

and a *complete* line of agricultural chemicals of all types.

Stauffer
CHEMICALS
SINCE 1885

STAUFFER CHEMICAL COMPANY
Agricultural Chemicals Division
380 Madison Avenue, New York 17, N. Y.
636 California Street, San Francisco, Cal.
Houston • Los Angeles • Omaha • Tampa • Harvey
Weslaco • North Little Rock • North Portland

with a general and rapid rise in infestation expected. The cotton bollworm was also on the increase in most of the cotton producing states. Heavy populations of this insect were reported from Arizona, New Mexico, Texas, Oklahoma and Tennessee. Spider mites by early August were beginning to be of concern in several states. Many fields in Missouri were being defoliated. Heavy local infestations were recorded from Arkansas, Mississippi, Georgia and North and South Carolina.

The Colorado potato beetle was reported in late July to be more abundant than normal in certain areas of Oregon. Heavy populations were also reported from Idaho and Delaware.

During this reporting period two cases of screw-worms were reported from Lancaster, South Carolina and one case from Fredericksburg, Virginia.

Bagworms were perhaps the most important ornamental pests reported on during the period. In Indiana the infestation was the worst on record with evergreens, maple, willow, birch, apple, and wild cherry having been heavily infested. Missouri also reported the heaviest recorded infestation with wide range of plants and shrubs being attacked. Other states reporting heavy infestations included Delaware, Pennsylvania, Virginia, West Virginia, Maryland, Georgia, Florida, Mississippi, Oklahoma and Illinois.

The pepper maggot has been found infesting pimiento pepper in Hart County, Georgia. There is a good chance that the insect is damaging pimiento and possibly bell pepper in other areas of the State. Heavy damage has been done in some fields of three South Carolina counties near the Georgia line. In addition to South Carolina, infestations have been reported recently from Alabama and North Carolina.★★

MED. FRUIT FLY

(*From Page* 48)

row through the fruit's pulp, dropping to the ground after about ten days to burrow into the ground and go through the pupa to the adult stage.

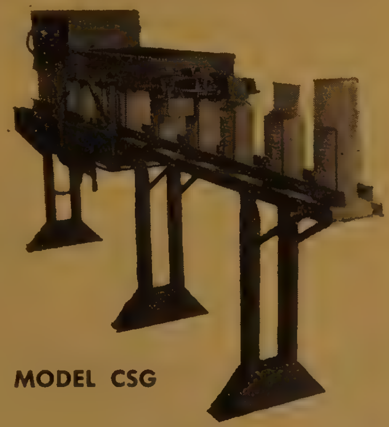
Two prime dangers from this pest lie in the methods of shipment of the infected fruit. Bulk shipment allows for insufficient inspection of the fruit, and a total embargo is often placed on the regulated areas to prevent this. The tourist, with his natural affinity for carrying fruit home, may be carrying a heavy supply of the larvae of the Mediterranean fruit fly. It is to reduce this last exit that the roadblocks and transportation terminal inspection stations have been set up.★★

WASHINGTON REPORT

(*From Page* 79)

in charge of Foreign Insect Control Assistance for the U. S. Department of Agriculture's Plant Pest Control Branch. Hambleton has had a great deal of on-the-spot experience in foreign countries and is well-known and respected for his accomplishments. In his opinion many indirect and delayed effects of this technical cooperation will show up to the advantage of the United States in the years ahead.

USDA's Agricultural Research Service assists the State Department's International Cooperation Administration in the governments of cooperating countries abroad to develop practical insect control programs. In ICA, E. N. Holmgreen, director of the Office of Food and Agriculture, is in charge of the overall operation of the program. Joseph E. Walker, chief of the Agronomy and Soils Branch, and Dr. Monroe McCown, Neareast area advisor, handle the technical and political problems respectively. These men are responsible for much of the success of the program in which some 400 tons of modern insecticides, 49 spray planes, 188 trucks, 544 power sprayers, and 10,881 hand sprayers have been imported into areas that never before employed large-scale insect destroying



MODEL CSG

The FRY MODEL CSG is a semi-automatic closing machine that double-folds, heat seals the inside of the bag and glues the second fold to the first. The result is a neat closure... heat-sealed for sift-proofness and glued for additional shipping or carrying strength. Operation is continuous and no reciprocating or cyclic motions are employed.

Adjustable for various bag heights. Model CSG also handles non-heatsealable bags by gluing folds.

FRY
SEALER-GLUER
BAG CLOSING
Machine

Ideal for

- INSECTICIDES
- FERTILIZERS
- CHEMICALS
- PLANT FOODS
- BRIQUETS
- MISCELLANEOUS POWDERS
- GRANULAR PRODUCTS

Write for informative folder on this and other models. Please submit bag and product samples.

GEORGE H. FRY COMPANY
42 EAST SECOND ST., MINEOLA, N.Y. TEL. Pioneer 6-6230

As Your
SUPER
DISTRIBUTOR
In The East

Plant and Warehouse in Hicksville, Long Island.

F & B have been mixers, packers and distributors of insecticides, fungicides and fertilizers for over 30 years.

***FAESY & BESTHOFF, INC.**

125 Spring St., New York 13, N. Y. Tel.: ALgonquin 5-7300

Montrose Chemical Corp.
of California

Now offers in Commercial Quantities

DDT
KRISP CHIPS

a new physical form of DDT with these advantages

Good Grindability
Excellent Solubility
Low Price

DDT KRISP CHIPS in form are between the lump and flake. They are highly recommended for either dust or liquid solutions.

For prices and samples, write to

R. W. GREEFF & CO., INC.
10 Rockefeller Plaza, New York, N. Y.
Tribune Tower, Chicago, Illinois

Are You Keeping in Touch
with **YOUR INDUSTRY?**

1 Year $3.00
2 Years $5.00

AGRICULTURAL CHEMICALS
BOX 31, CALDWELL, N. J.
YES! Send me Agricultural Chemicals
Enclosed is my check for $........................
....
....
....

Complete up-to-date news of the agricultural insecticide and fertilizer industry are reported monthly in AGRICULTURAL CHEMICALS. Regular features and columns keep you informed of technical and trade news. Enter your subscription now.

AGRICULTURAL CHEMICALS
BOX 31 CALDWELL, N. J.

measures. During the six years of the program, three million U. S. dollars have been spent, plus three times as much in terms of local foreign currencies.

According to reports reaching *Agricultural Chemicals* the pest control programs have often been the most spectacular and most successful single operation conducted in countries where our International Cooperation Program is operating.

Pest control is being firmly planned abroad. Let's hope that U. S. companies get their share of the business.★★

WATER HYACINTH

(*From Page* 38)

---

help eliminate the fringe growth that inevitably survives nearly every spraying or chopping operation.

On the subject of relative damage according to age of plant, the 1948 group had this to say: "The sensitivity of hyacinth leaves to 2,4-D increased with the age of the leaves, the older leaves being the first to discolor and die. The relative degree of browning within three days after treatment served as an approximate indication of the dose of 2,4-D which had been applied. An effective dose of 2,4-D which eventually killed 90 per cent or more of the hyacinths, caused noticeable browning on the middle-aged and on some of the younger leaves within 48 hours. 2,4-D sprays containing 0.25 per cent Nekal NS caused a more uniform and more extensive browning of the leaves than a similar spray not containing Nekal NS or containing a less effective spreader, such as Tergitol #7 or Tween #20. Any 2,4-D treatment which failed to cause an additional and noticeable browning of hyacinth foliage within three days proved to be ineffective treatment regardless of the time of year the spray was applied."[†]

The sinking of the water hyacinth brought about by 2,4-D treatment has several advantages over other previous methods of killing the plant. It completely eliminates matting, thus quickly clearing the stream to navigation or drainage. Disappearance of the matting, base for the spread of the alligator weed, causes wholesale drowning of that destructive weed. And, perhaps most important, 2,4-D kills a much higher percentage of the hyacinth than did any other herbicide tested.

Several application methods have been employed since first large scale use of 2,4-D was started in 1949. In the 1948 experiments a four-nozzle spray boom was used from land and from a boat with marked success. Various other spray equipment has been used, including a Bean "Royal 35" and a Spraying Systems "OC Boomjet."

Best results achieved in the past (and one of the methods that the Army Engineers are expected to employ in the next five years) was spraying by helicopter. Its great manuverability permit its use in previously impassable swamps, and along waterways that may be heavily forested, all with little discomfort to the operator. Even along canals and rivers lined with 50 to 75-foot trees, complete killing from bank to bank is effected by use of the helicopter. Slight leaf and twig damage to the trees *was* noted, but it was observed that it was principally of a temporary nature. The cypress, one of the chief trees in the Louisiana test area, developed a new crop of leaves within a month after being badly damaged by spray "fall-out."

Browning of the hyacinth foliage occurred so quickly (in 30 minutes) that the pilot could use the browning as a boundary in later passes over the area to be sprayed. Even in spraying during intermittent showers, a "kill" figure as high as 90 per cent was achieved through use of the helicopter.

Again with the helicopter, various spray equipment and techniques were employed. On the helicopter's horizonal spraying boom, upwards of 66 separate nozzles have been installed, each delivering 0.2 gallons per minute at a pressure of 45 p.s.i. Depending on the height of the trees, good results were obtained at heights of from 40 to 80 feet above the water.

[†] Ibid.

Danitra

Let DAVIES DO IT!

We will formulate your LIQUID and WATER SOLUBLE FERTILIZERS

Completely soluble fertilizer blended to YOUR specifications

Features of Davies Service:

1. Modern Plant — Extensive Facilities
2. Prime Source of Raw Materials
3. Technical Know-how
4. Low Cost
5. Complete Packaging under Your Own Label
6. Eliminates Manufacturing Investment for Customer

•

Blend in the finest of

TRACE ELEMENTS

In Your Fertilizer With

NUTRAMIN

a completely soluble blend of Manganese, Iron, Copper, Zinc, Magnesium, Boron and Molybdenum in scientifically controlled proportion

Davies Nitrate Co.
INCORPORATED
118 LIBERTY STREET NEW YORK 6, N. Y.

"USE WITH CONFIDENCE"

A NATURAL QUALITY PRODUCT

TAKO

Airfloated: Bagged or Bulk

Guaranteed less 1% free moisture

QUALITY & SERVICE SINCE 1939

A HIGH GRADE COLLOIDAL KAOLINITIC KAOLIN

Used in large tonnage for years most successfully and economically as a prilling agent and conditioner of fertilizers. Excellent adhesive — absorption — colloidal properties. Excels in formulations of insecticides.

NON-ABRASIVE NON-HYGROSCOPIC NON-CAKING FREE-FLOWING

Shipping Point:
Plants:
Hackleburg, Alabama

THE THOMAS ALABAMA KAOLIN COMPANY,
2412 KEN OAK ROAD, BALTIMORE 9, MARYLAND
IT WILL PAY YOU TO INVESTIGATE "TAKO" FOR YOUR REQUIREMENTS

Uniform Quality
Prompt Shipments

Though most of the tests were conducted at speeds of 30 mph, helicopters since have achieved higher "kill" percentages at slower speeds.

From the office of the District Engineer, Corps of Engineers, New Orleans District, it is reported that many mechanical devices will also be combined with the chemical method, and that a well balanced schedule employing both eradication techniques will be put into operation. The Corps of Engineers reports very good success with a ½% solution of 2,4-D applied at the rate of two pounds acid equivalent per acre.

However, 2,4-D success against the water hyacinth has brought up other problems. Lt. Col. R. G. Rhodes, Executive to the District Engineer at New Orleans, reports:

"While the water hyacinth no longer presents a problem in methods of chemical destruction, the same cannot be said for alligator weed, which is slowly encroaching on the area freed of hyacinths. This plant grows equally well ashore and afloat, but seems to undergo certain changes when waterborne. There is no problem in destroying this plant by chemicals when it is found ashore, but those engaged in the work find that the same treatment is non-productive of satisfactory results when applied to floating alligator weed. This fact has led to some confusion in reporting results obtained and occasionally one hears that floating alligator weed can be killed as easily as the water hyacinth by using the same chemical treatment. Research work is being continued to determine the reasons for this peculiar action of alligator weed, and the findings will probably be the key to the satisfactory destruction of this weed by chemical means."

In addition to the mowing boats, plus various "crusher" equipment, the Corps of Engineers will employ spray-mounted patrol boats of various sizes. Some of the smaller types are even equipped with elevated guns for reaching over fringe growths along the streams to treat adjacent feeder areas.

Agricultural experts have expressed doubt about the value of legislating any active quarantine measures against the spread of the hyacinth, arguing that the cost would exceed the value. It is pointed out the existing Plant Quarantine Act of August 20, 1912, as amended, already authorizes the USDA to regulate the importation and interstate movement of plants that may carry injurious insects and plant diseases, but that there is a lack of authority in that Act to regulate such movement of plants which may be or may become pests in themselves. Rep. Willis' Bill may fill the need for such authority by making it a crime to transport the hyacinth from state to state.

From at least one standpoint, the new drive against this destructive scourge was approved in the nick of time. Agricultural experts have observed in the past few years that the hyacinth is far too quick to acclimate itself to undesirable growing conditions, so that it has already been able to survive in the brackish water far out in the Delta region. It is possible that it may be able to grow in ocean water, and in the future even harbors and sea-side resorts may be infested by water hyacinth, just as it now plagues our inland waters! ★★

GUEST EDITORIAL

(*From Page 35*)

Public understanding is lagging in some respects, and our industry must be mindful of the need to encourage people to inform themselves fully and accurately about agricultural chemicals.

The development of better and better products may be expected to give farmers and industry the means of doing better jobs at lower cost. Greater and greater cooperation and interdependence will develop between our industry and agriculture. We must zealously guard our good name for quality products and accurate information about use of the products.

Not all producers of agricultural chemicals will stay in business, and not all people now selling them at wholesale or retail will continue to do so. As any area of human activity matures, a process of selection takes place, and some drop out while others prosper even more.

It seems to me there are four foundation stones to the success of any business, and they are easy to name. One is research, which improves uses of existing products and seeks new and better products. Two is production which turns out goods of top quality. Three is hard-hitting sales, which can be seen also as an educational effort, to teach people how to take advantage of agricultural chemicals, and four is the active cultivation of a good climate of public opinion.

As we make progress in these four areas, any of us can grow. As we lag in any of these areas, we can raise serious questions about our own business future. The potential ahead is tremendous, for our industry, for agriculture, and for the consumer. As a mature industry ours can make a great new contribution to the nation and the world.★★

FERTILIZER NEWS

(*From Page 60*)

Dr. Epstein has shown that the cell membrane or the cell wall is the key to the secret. This membrane is not like a sieve through whose meshes the ions may move on their own power in or out at will. At one time, this was the accepted theory. The scientists now seem to know better. Plants actually select which ions they want and which they will not permit to pass through the membrane. In other words, the membrane not only selects the ion but also transports it to the interior of the cell. As one writer describes the process: "self-powered ferries seem to ply through the membrane giving free rides to nutrient ions." The process works through enzymes in the membrane which pick up the free ions surrounding the root tip, pass them along through the membrane and release them inside the cell proper.

As mentioned previously the root membrane selects the ions to be transferred across its substance. The enzymes are highly specialized as to the kind of ion "passengers" they will transport. Ions can be grouped into classes, and the ions of one group compete among themselves for the ferry ride. But one group does not compete with the other group. For example, we may consider the group, potassium, rubidium and cesium — three elements of close kinship. These will compete among themselves for the ferry ride. But if sodium and potassium are present, members of different groups, they will not compete with each other: both will be transported freely.

This is of course a simplification of a complex physiologic process. The new research undoubtedly will give us all more understanding of the process at the root tip and will in the long run help farmers to apply chemical fertilizers with greater efficiency and savings.

Top-dressing by Aircraft

WHOEVER would have thought a few years ago that aviation and agriculture would be combined into industry and that New Zealand would be the pioneer in this field!" Those were the remarks among others made by the United States Ambassador to New Zealand about a year ago when the first ten Fletcher FV-24 aircraft were delivered for aerial top-dressing. The Fletcher machine was designed by the Fletcher Aviation Co. of Pasadena, California and is reputed to be able to carry a load as heavy as itself. More than 100 such machines are in use for aerial top-dressing of grazing lands in the two islands of this Dominion. This spring the first of three Bell 47G American-made helicopters was delivered to New Zealand. This Bell machine is designed for farm purposes and has a pay-load of 600 pounds and a top speed of 90 miles an hour. Thus New Zealand agriculture is meeting the challenge of how to fertilize adequately and cheaply the grasslands on its rugged, mountainous terrain. Fertilizer distributors drawn by tractor or work animal were found impractical on these lands and superphosphate (of which about 1,000,000 tons are used per year) was broadcast chiefly by hand. Now helicopter aand airplane are rapidly taking over the job of top-dressing. In the matter of top-dressing pastures exclusively it is generally agreed that New Zealand is now leading the world.

Our western ranges and many of the meadows in the mountainous areas of the United States could undoubtedly benefit from aerial top-dressing by helicopter or airplane. Perhaps in our country we lack the necessity at present of doing this job that impels the New Zealanders. However, it seems to me the time is not too distant when topdressing grazing land by air will also be popular in the United States.★★

SPRAY SAFELY!

WILLSON AGRI-TOX RESPIRATOR

USDA accepted protection against Systox, Parathion, TEPP, Aldrin, Chlordane, etc.

Spray safely with Willson Agri-Tox, the universal respirator for handling and applying toxic farm chemicals. Write for bulletin, prices and name of your nearest distributor.

WILLSON PRODUCTS DIVISION RAY-O-VAC COMPANY

Leaders in Research and Development of Safety Equipment Since 1870

116 Thorn Street, Reading, Pennsylvania

HANDBOOK OF AGRICULTURAL PEST CONTROL

by

S. F. Bailey and L. M. Smith

CONTENTS

The Commercial Agricultural Chemicals
Physical and Chemical Properties
Compatibility
Containers
Fumigants and Fumigation
Toxicology and Residues
Spray Oils and their Properties
Spraying Machines
Rates of Delivery of Spray Machines
Rates of Application for Sprays
Dusts and Dusting
Aircraft
Mosquito Control
Hazards
Miscellaneous Topics
Tables and Formulas
Terms and Symbols

184 PAGES $3.25 in U. S. A.

Send check with order

INDUSTRY PUBLICATIONS, Inc.

P.O. Box 31 Caldwell, N. J.

There's SALES POWER IN YOUR NAME . . .

Private labeling assures you an exclusive on your line in your market! Your customers can't reorder from anyone but YOU! It will PAY you to investigate, NOW!

PBI

Write, Wire or Phone
Finley 2-8780

PRIVATE BRANDS
INC.
300 SOUTH 3rd STREET
DEPT. AG-1
KANSAS CITY, KANSAS

Who makes the *Clearest Pyrethrum Extract?*

▩ As the recognized pioneer in the development and processing of pyrethrum, MGK is the original and first producer of standardized pyrethrum extracts of brilliant clarity. In addition, we have developed excellent synergized pyrethrum concentrates, dusts and powders. If your insecticidal sprays, dusts or aerosols include the use of pyrethrum in any form, or the use of its companion product allethrin, write for the latest authoritative data. We also have available recent information concerning the most effective synergists, MGK 264 and piperonyl butoxide.

McLAUGHLIN GORMLEY KING Company

1711 S. E. FIFTH STREET / MINNEAPOLIS, MINNESOTA

---

easier handling • dependable

TRIGGER ACTION GunJet SPRAY GUNS

No. 42 Series

for orchard, livestock and spot spraying

Extra-long "four finger" trigger for comfort, adjustable trigger stop to set desired spray pattern, and trigger lock for continuous spraying are a few of the advanced GunJet No. 42 features. A top quality gun for pressures up to 800 pounds. Full choice of types and capacities with hardened stainless steel tips for maximum wear resistance. Made in brass and aluminum.

for complete information write for free Bulletin 80.

SPRAYING SYSTEMS COMPANY
3230 Randolph Street Bellwood, Illinois

---

to sell the Kansas farmer buy the

PUBLISHED BY CAPPER PUBLICATIONS LARGEST AGRICULTURAL PRESS IN THE WORLD
Sales Offices: New York, Cleveland, Chicago, Topeka, Los Angeles and San Francisco

PROFESSIONAL *Directory*

ALVIN J. COX, Ph.D.

Chemical Engineer and Chemist

(Formerly Director of Science, Government of the Philippine Islands. Retired Chief, Bureau of Chemistry, State of California, Department of Agriculture.)

ADVISER ON AGRICULTURAL CHEMICAL PROBLEMS AND INVESTIGATIONS

Consultant in reference to spray injury and damage, claims, including imports of fruits and nuts, formulas, labeling, advertising and compliance with law.

1118 Emerson Street
Palo Alto, California

Theodore Riedeburg Associates

Sales Consultants

and

Manufacturers' Representatives

on

Agricultural Chemicals

415 Lexington Ave.
New York 17, New York
MUrray Hill 7-1488

MEMO TO:
Suppliers of Agricultural Chemicals
FROM:
Crippen & Erlich Laboratories
A subsidiary of Foster D. Snell, Inc.
1138 E. North Avenue
Baltimore 2, Maryland
Tel. Belmont 5-6350
SUBJECT:
Testing of Agricultural Chemicals

Write for our complete price list covering Insecticides. Fungicide, Herbicide, Rodenticide and Fertilizer Analyses.

---

this space reserved for

your advertisement

Make yourself
known throughout
the industry

FLORIDA FIELD TRIALS

Evaluations

of

Agricultural Chemicals.

DR. G. R. TOWNSEND

Box 356

Belle Glade, Florida

FRIAR M. THOMPSON, JR.

Consultant

Specializing in insecticides, rodenticides, fungicides, weed controllers for industry, household, and farm.
Product formulation, testing, labeling.

Athens, Georgia

SOIL & PLANT TESTS

SOIL FERTILITY PROBLEMS

EVALUATION OF AGRICULTURAL CHEMICALS

Dr. Wolf's Agricultural Laboratories
2620 Taylor St. Hollywood, Fla.

E. H. SIEGLER, Ph. D.

(Formerly U. S. Department Agriculture)

Pesticide Consultant

Washington Representative

Preliminary appraisal of chemicals for control of pests of agricultural crops; field research with promising formulations for determination of pesticidal utility and residues; preparation of petitions for certification of usefulness.

201 Tulip Avenue, Takoma Park, 12,
WASHINGTON, D. C.
PHONE: JUNIPER 5-1555

AC on Microfilm

All issues of AGRICULTURAL CHEMICALS are available on Microfilm.

Librarians and other interested subscribers can contact University Microfilms, 13 North First Street, Ann Arbor, Mich., for price information and copies.

Have you a service to sell?

Are you a consultant . . .

a representative?

a salesman?

Offer your talents, your services, your facilities in the agricultural chemical industry's only professional directory.

Advertising rates on request.

N.Y. Phone: Barclay 7-7121
Caldwell, N. J.: Caldwell 6-5520

AGRICULTURAL CHEMICALS

P.O. Box 31 Caldwell, N. J.

WISCONSIN
ALUMNI
RESEARCH
FOUNDATION

LABORATORY SERVICES

Biological evaluation of insecticides
Screening of compounds for insecticidal, fungicidal, and bactericidal properties
Bioassay of insecticide residues on crops
Chemical determination of insecticides

Pharmacology including warm-blooded toxicity studies
Warfarin assays—physico-chemical and biological
Other biological, chemical, and microbiological services

PROJECT RESEARCH AND CONSULTATION

Write for Price Schedule

WISCONSIN ALUMNI RESEARCH FOUNDATION
P.O. Box 2217-B • Madison 1, Wisconsin

MODERN REBUILT MACHINERY

UNION
Rebuilt Machinery
Established 1912

Specially Priced For Quick Sale

Mikro 3TH, 3W, 2TH, 1SH, 1F Pulverizers.
Baker Perkins 50 gal. Stainless Steel Double Arm Jacketed Mixers.
J. H. Day Dry Powder Mixers, 50 to 10,000 lbs. cap.
Day 450 gal. and 650 gal. Steam Jacketed Jumbo Mixers.
Resin LC and Capem 1 and 4 Head Automatic Cappers.
Burt 611 AUB, Knapp NA4 and D Wraparound Labelers.
Day, Robinson, Rotex, Tyler Hum-mer, Raymond, Great Western and Gayco Sifters.
Transwrap Model B Auger Filler.
Triangle Model U1 Auger Powder Filler.
Stokes and Smith G1, G6, HG88 Duplex Auger Fillers.
Pony, Ermold, World Semi and Fully Auto. Labelers.
Standard Knapp 429 Automatic Carton Sealer.
Package Machinery FA, FAQ, FA2 Auto. Wrappers.
Hayssen, Scandia, Miller, Campbell, Oliver Wrappers.

Tremendous Stock of—Mixers, Labelers, Dryers, Fillers, Sifters, Grinders, Cappers, Pulverizers, Packaging and Carton Sealing Machines.

IMMEDIATE DELIVERIES

Write, Wire, Phone Collect for Details and Prices

UNION STANDARD EQUIPMENT CO.
318-322 Lafayette St. New York 12, N. Y.

PRODUCERS AND PROCESSORS
OF
HIGHEST QUALITY
KENCO
INDUSTRIAL MINERALS
FOR
INSECTICIDE DUST
AND
NUCLAY - FOR - ANTIBIOTICS

KENNEDY MINERALS, CO., INC.
2550 East Olympic Blvd.
Los Angeles 23, California

Lancaster, Allwine & Rommel
Registered Patent Attorneys
Suite 428,
815—15th STREET, N. W.
Washington 5, D. C.

Patent Practice before U.S. Patent Office. Validity and Infringement Investigations and Opinions.

Booklet and form "Evidence of Conception" forwarded upon request.

Classified ADVERTISING

Rates for classified advertisments are ten cents per word, $2.00 minimum, except those of individuals seeking employment, where the rate is five cents per word, $1.00 minimum. *Check must accompany all classified advertisments.* Address all replies to Classified Advertisements with Box Number care of AGRICULTURAL CHEMICALS, P. O. Box 31, Caldwell, N. J. Closing date: 10th of preceding month.

Situations Wanted:

ENTOMOLOGIST: M. S. degree plus seven years experience in formulation evaluation and field testing of insecticides. Age 33, married, excellent references. Address Box 133, c/o **Agricultural Chemicals.**

AGRICULTURIST — M. S. degree. Formulated and field tested pesticides. Chemical, agronomy, and entomology background. Prefers technical service or sales development. Address Box 134, c/o **Agricultural Chemicals.**

B. S. AGRICULTURE. Desire position leading to responsibility and supervision. Training in agricultural, botanical, and chemical courses. Experience 5 years chemical laboratories including supervision plus some selling. Age 35, married, veteran. Address Box 137, c/o **Agricultural Chemicals.**

POSITION WANTED: Plant Superintendent or Assistant: Nine years supervisory experience in the production and formulation of finished agricultural insecticides. Will receive B.S. degree in Chemistry in August 1956. Desire a challenging position with a growing concern . Address Box 136 c/o **Agricultural Chemicals.**

Help Wanted:

MAJOR AGRICULTURAL CHEMICAL COMPANY desires salesman experienced in selling herbicides, soil sterilants, and fumigants to industrial and agricultural trade. Degree in Entomology or Plant Pathology desirable. Splendid opportunity for industrious man. Send record of experience and education to Box 132, c/o **Agricultural Chemicals.**

For Sale:

FOR SALE: THANITE, TETRACHLORETHANE, CHLOROFORM, ETHYLENE DICHLORIDE; spot New York, Philadelphia and Chicago available way below list price. Aceto Chemical Co., Inc. 4040 Lawrence Street, Flushing 54, N. Y. IN. 1-4100.

WEED & PEST CONTROL BUSINESS in Arizona. Established ten years. 1955 Jeep, 1944 1½ Ton Ford Truck, 600 gal. Hardie sprayer, 200 gal. Hardie sprayer, 100 gal. Bean sprayer, Bean lawn sprayer, 1948 TFFA, Spray booms, hand tools. Price $15,900. Address Box 135, c/o **Agricultural Chemicals.**

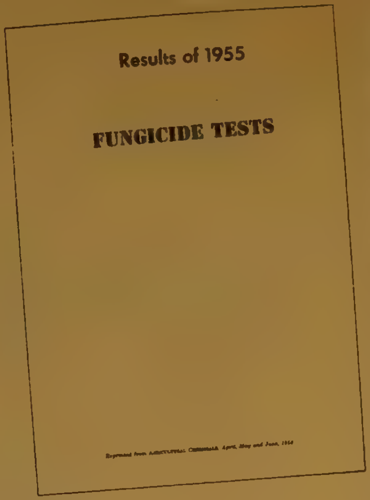
FOR SALE: (3) Sprout Waldron size 12 Ribbon Mixers, 336 cu. ft. work. cap; (3) Jeffrey 150 cu. ft. steel hoppers and scales; Rotary Steam Tube Dryer 4′ dia. x 30′ long; Rotary Hot Air Dryers 3′ dia. x 24′ long, 4′6″ dia. x 40′ long; 5′½″ dia. x 30′ long; also Hammer Mills, Mikro Pulverizers, Ball Mills, Jaw Crushers. Over 75 one-piece welded steel tanks from 4300 gal. to 23.000 gal. sizes. Perry Equipment Corp., 1428 N. 6th St., Phila. 22, Pa.

SALES MANAGER

The oldest and largest complete Liquid Fertilizer Company is expanding and has opening for man who can enlarge and train our sales force selling direct to farmers and dealers. Product nationally advertised. We are building factories in strategic locations. This industry is practically new with unlimited possibilities. Fertilizer experience valuable, but not absolutely necessary.

This position requires a self starter. Only results count. The man we want is employed but not quite satisfied with his possibility for advancement.

Salary and bonus open but in the five figure class to start. All correspondence strictly confidential. Write giving full particulars, experience. Personal interview will be arranged. H. A. Petrich, Pres. "Na-Churs" Plant Food Co., Marion, Ohio.


Results of 1955

FUNGICIDE TESTS

1955 FUNGICIDE TESTS

The complete results of 1955 fungicide tests, listing response of various crops to commercial and experimental fungicides are contained in a 20-page, bound booklet.

The publication of these results is under the sponsorship of the American Phytopathological Society. It is a continuation of the publication of results formerly provided through a supplement of the Plant Disease Epidemics and Identification Section, USDA.

Price: $1.00

Postpaid if check accompanies order — postage and handling charges added where orders must be billed.

Send your check with order to:

Department of Plant Pathology
Dr. A. G. Newhall
College of Agriculture
Cornell University
Ithaca, New York

Practical Books For Your Library . . .

Soils and Soil Fertility

by L. M. Thompson

330 pages, $5.25 — This authoritative treatment begins by telling what soil is—what makes it up physically, chemically, biologically—and what its moisture-holding characteristics are. The use of commercial fertilizers and farm manure are other subjects under discussion.

Chemistry and Uses of Insecticides

by E. R. de Ong

345 pages, $7.00 — This book covers all the major insecticidal agents in detail, describing not only their chemical nature and properties, but also their specific action on various types of insects, their methods of application, and their effect on animals and humans.

Phosphates in Agriculture

by Vincent Sauchelli

175 pages, $2.75—It deals with the subject of rock phosphate versus superphosphate and colloidal phosphate; with the origin of phosphorus, the mining and processing of the phosphate rock, granulation of superphosphates, fixation of phosphates in the soil, losses of phosphorus and replenishments, phosphorus in nutrition, radioactive phosphorus, basic slag, fused and sintered phosphates and TVA research data on phosphates from field tests in 13 states.

Manual on Fertilizer Manufacture

Second and Enlarged Edition

by Vincent Sauchelli

$4.75—Complete volume on superphosphate and mixed fertilizer manufacture for the use of the operating men in the fertilizer works.

The Care and Feeding of Garden Plants

370 pages, $3.25 — Written by 14 leading specialists in plant nutrition, this profusely illustrated volume tells how to grow more plump, juicy vegetables, a finer lawn, healthier shade and fruit trees, more colorful garden flowers and house plants.

Books Sent Postpaid if Check is Enclosed with Order

Agricultural Chemicals
P. O. Box 31, Caldwell, N. J.

Enclosed is payment. Please send the books checked.

- ☐ Dust Diluents and Carriers—$4.75
- ☐ Handbook of Agricultural Pest Control — $3.25
- ☐ Insect Control by Chemistry — $13.75
- ☐ Chemistry and Action of Insecticides — $8.25
- ☐ Destructive and Useful Insects. Their Habits and Control — $12.75
- ☐ Insect Resistance in Crop Plants—$9.80
- ☐ Weed Control — $8.25
- ☐ Soils and Fertilizers — $6.25
- ☐ Soils and Soil Fertility — $5.25
- ☐ Chemistry and Uses of Insecticides — $7.00
- ☐ Phosphates in Agriculture—$2.75
- ☐ Manual on Fertilizer Manufacture — $4.75
- ☐ The Care and Feeding of Garden Plants — $3.25

*All prices above are in U.S.A. only — Add 50¢ for Foreign.

Name ....

Address ....

City, Zone & State ....

Handbook of Agricultural Pest Control

by S. F. Bailey and L. M. Smith

190 pages, $3.25—A practical handbook for the custom spray operator, the pest control operator, farm advisor, agricultural chemical salesman and field worker. This handbook covers the agricultural chemicals (insecticides, fungicides, herbicides, plant hormones and nutrient sprays, defoliant, etc.), their rates of application, useful formulas, as well as chapters on fumigation, spray machines, toxicology, dusts and dusting, aircraft, and mosquito control.

Handbook of Insecticide Dust Diluents & Carriers

by D. E. Weidhaas and J. L. Brann, Jr.

Commercial information and data based on research conducted at Cornell University and that supplied by basic manufacturers of the insecticide dust diluents and carriers.

Insect Control by Chemicals

by A. W. A. Brown

817 pages, $13.75 — This text classifies the insecticides and gives their chemical, physical properties; discusses the hazards to avoid in formulation, mixing and use of compounds; and illustrates modern application equipment.

The Chemistry and Action of Insecticides

by H. E. Shephard

504 pages, $8.25 — This new book gives a vast wealth of information on insecticides—their chemical, physical, and toxicological aspects. Covers these chemical groups: Arsenical Compounds; Fluorine Compounds. Sulphur Compounds; Copper Compounds; Inorganic Substances; Nicotine; Rotenone; Petroleum, Soaps, Creosotes; Synthetic Organic Insecticides.

Destructive and Useful Insects Their Habits and Control

by C. L. Metcalf and W. P. Flint

1071 pages, $12.75 — This authoritative guidebook covers hundreds of both useful and destructive insects—treating the inner and outer structure and form of general species. Here are descriptions of more than 500 types of insect pests of the U. S. and Southern Canada.

Insect Resistance in Crop Plants

by Dr. Reginald H. Painter

520 page, $9.80—Here is a complete analysis of the relationship between crops and phytophagous insects together with a full analysis of the insect resistant varieties of important crops, such as wheat, corn, cotton, sorghums, potato.

Weed Control

by W. W. Robbins, A. C. Crafts, and R. N. Raynor

543 pages, $8.25 — Here is an authoritative, thorough book. Based on experience, research and experiment, it shows what methods of weed control have proved most effective for weeds of all species—shows how and when to apply a control measure, the season and rate of application, dosage, etc., and outlines the materials and machinery needed.

Soils and Fertilizers

by F. E. Bear

375 pages, $6.25 — This text presents the basic scientific facts and principles behind the production and utilization of agricultural chemicals.

Index to ADVERTISERS

Agricultural Chemicals, Inc. 117
African Pyrethrum Development, Inc. 72
Thos. Alabama Kaolin Co. 138
American Agricultural Chemical Co. Aug.
American Cyanamid Co. 34
American Potash & Chemical Corp. Aug.
W. R. E. Andrews Sales, Inc. 127
Arkell Safety Bag Co. 23
Antara Chemical Div., General Aniline & Film Corp. 20
Ashcraft-Wilkinson Co. 15
Atlantic Refining Co. 26
Atlas Powder Co. 30, 31

Bagpak Div., International Paper Co. 3rd Cover
Bell Clay Co. Aug.
Bemis Bro. Bag Co. 11
Berkshire Chemicals, Inc. 128
Blue Valley Engr. & Equip. Mfg. Co. Aug.
Bonneville, Ltd. July
Bradley Pulverizer Co. 109
Burlap Council, The 68

California Spray Chem. Co. 102
Capper Publications 140
Carbide & Carbon Chemicals Co. 29
Chemagro Corp. 98
Clark Equipment Co. July
Climax Molybdenum Co. Aug.
R. D. Cole Mfg. Co. Aug.
Combustion Engineering, Inc. Raymond Division 92
Commercial Solvents Corp. 17
Continental Can Co., Shellmar Betner Div. Aug.
Cox, Dr. Alvin J. 141

Davies Nitrate Co., Inc. 137
Davison Chemical Co., Div. of W. R. Grace & Co. Aug.
Deere & Co., Grand River Chem. Div. 108
Diamond Alkali Co. 70
Dorr-Oliver Co. Aug.
Dow Chemical Co. 121
L. A. Dreyfus Co. 63
Duval Sulphur & Potash Co. 15

Emulsol Chemical Corp. 24
E. I. du Pont de Nemours & Co. 116

Faesy and Besthoff, Inc. 136
Fairfield Chemical Div., Food Machinery & Chemical Co. 4th Cover
Flag Sulphur & Chem. Co. 114
Floridin Co. 10
Fry Co., Geo. H. 135
Fulton Bag & Cotton Mills 20

Geigy Chemical Co. 27
General American Transportation Corp. 85
Glendon Pyrophyllite Co. 120
Grand River Chemical Division of Deere & Co. 108
Greeff & Co., R. W. 136
Grinnell Co. Aug.

Hammond Bag & Paper Co. July
Hardinge Co. Aug.
Heckathorn United & Co. 132
Hercules Powder Co. 32
Huber, J. M. Corp. 68
Hudson Pulp & Paper Corp. 90

International Minerals & Chemical Corp. 18, 19

Johns-Manville Co. 25, 119
Johnson, C. S. & Co. 126

Kennedy Minerals Co., Inc. 142
Kolker Chemical Co. 113
Koppers Co. Aug.
Kraft Bag Co. Aug.

Lancaster, Allwine & Rommel 142
Lion Oil Co. 22
Lummus Co. 108
Luria Engineering Co. 110

McLaughlin Gormley King Co. 140
Michigan Chemical Corp. 95
Mine Safety Appliances Co. Aug.
Minerals & Chemicals Corp. of America 4

National Potash Co. 78
National Agricultural Chemicals Assn. 122
National Aniline Div., Allied Chem. & Dye Corp. 8
Naugatuck Chemical Division, U. S. Rubber Co. 124
Niagara Chemical Division, Food Machinery & Chemical Corp. 14
Ninol Laboratories, Inc. 10A
Nitrogen Div., Allied Chem. & Dye Corp. 9
Nopco Chemical Co. 100
Oldbury Electro Chemical Co. Aug.
Olin Mathieson Chemical Corp. 2nd Cover

Pacific Coast Borax Co. Aug.
Penick, S. B. & Co. 75
Pennsylvania Salt Manufacturing Co. 16
Phelps Dodge Refining Corp. 17
Phillips Chemical Co. 74
Polychemicals Division, West Virginia Pulp and Paper Co. Aug.
Potash Company of America 3
Poulsen Co. 134
Powell, John & Co. 2nd Cover
Prentiss Drug & Chemical Co. 112
Presto Manufacturing Co. Aug.
Private Brands, Inc. 140

Raymond Bag Corp. Aug.
Raymond Division, Combustion Engineering, Inc. 92
Refined Products Corp. 12
Republic Steel Corp. Aug.
Renneburg & Sons Co., Edw. 138
Reideburg, Theodore Associates 141
Richfield Oil Corp. July
Rohm & Haas Co. 58

Shell Chemical Co. 7
Sinclair Chemicals 6
Sohio Chemical Co. July
Southeastern Clay Co. 123
Spencer Chemical Co. Aug.
Spraying Systems Co. 140
Stauffer Chemical Co. 134
Stedman Foundry & Machine Co. 129
Sturtevant Mill Corp. Aug.
St. Regis Paper Co. 106, 107
Southwest Potash Corp. 67
Summit Mining Corp. 104

Tennessee Corp. 73
Texas Gulf Sulphur Co. Aug.
Thayer Scale Co. Aug.
Townsend, Dr. G. R. 141

Union Bag & Paper Corp. 97
Union Carbide & Carbon Aug.
Union Special Machine Co. Aug.
Union Standard Equipment Co. 142
U. S. Phosphoric Products, Div. Tennessee Corp. 76
U. S. Potash Co. 82
U. S. Industrial Chemicals Co. Aug.

Vanderbilt Co., R. T. 118
Velsicol Chemical Corp. 56
Vulcan Containers, Inc. Aug.

West End Chemical Co. 64
Willson Products, Inc. 139
Wisconsin Alumni Research Foundation 142
Woodward & Dickerson, Inc. 132
West Virginia Pulp and Paper Co. Aug.

Young Machinery Co. 125

Zonolite Co. 115

Tale Ends

REPORTS of the developing resistance to chlorinated hydrocarbon insecticides continue to come from the cotton belt this season. First word of such a problem, which startled the insecticide industry about a year ago (See *Ag Chem*, Nov., 1955, Pg 64) originated in Louisiana. Many in the pesticide industry at first greeted the reports almost with disbelief, but evidence from other cotton states this season tends to confirm the Louisiana findings. Elsewhere in this issue a Texas producer of cotton pesticides says, "we consider severe insect resistance to several chlorinated hydrocarbons to be an established fact."

One result has been a big increase in use of calcium arsenate as a cotton poison this season. After occupying what has amounted to practically a dormant status for the past ten years, calcium arsenate reappears in 1956 as an important cotton pesticide. The big factor in its rejuvenation this season was of course the fact that Louisiana advocated its use wherever there was any evidence of build up of resistance. ("Ag Chem" Dec., 1955, Pg. 64.)

Monsanto research workers have recently patented a method of making soil resistant to erosion. Water-soluble acrylic polymers, covered by their U. S. patent 2,754,623 are sprinkled on the soil surface, preferably in powder form, and have the effect of stabilizing the soil for a year or more. The material does not prevent the growth of seedlings, but merely serves to make the soil resistant to erosion until grass or another cover crop takes hold.

Do high clearance spray machines provide a lower cost method of putting insecticide on cotton than aerial application? The answer depends on how much use the grower can make of the high clearance rig, says James H. White of the Arkansas Agricultural Experiment Station, who recently completed a comparative study of the two methods. He concluded that where a grower would use a rig on 1,000 acres or less a year, he would be better off using the services of a custom applicator. Machine acre costs, according to his study, ranged between 22 and 44¢ based on how many acres were sprayed a season. Cost for custom aerial application was about 48¢ an acre in 1955, Mr. White reported.

Two past presidents of the Entomological Society of America are to be considered for honorary membership in ESA at the coming New York meeting, — J. J. Davis and E. M. Walker. Prof. Davis who retired earlier this year as head of the Department of Entomology at Purdue has made outstanding contributions as a teacher, a research worker and in association business as well. Dr. Walker, while not as widely known in the United States, has for years been one of Canada's leading entomologists. Both men generously merit the honor that is being considered for them.

The trend in the chemical business the past few years has been strongly toward upgrading of products. Instead of selling basic chemicals at so much a ton, a good many of the basic producers are now more interested in making finished products and getting top dollar per pound. Latest in a long line of producers of basic chemicals to swing in this direction is American Potash & Chemical Corp. With a research budget amounting to three and a half percent of total sales, they are intensifying their research on new, more highly processed forms of lithium, bromine and boron.

Put all your eggs in one basket!

REGARDLESS of the old adage — it sometimes makes sense to put all your eggs in one basket — if you have the choice between one strong basket and several weak ones.

In advertising, it's far better to concentrate your program in the leading magazine in the field. That way, the people who really count will be sure to see your message — and read it **often.**

In the agricultural chemicals field, the strongest basket is, of course

AGRICULTURAL CHEMICALS

Caldwell **New Jersey**

Member Audit Bureau of Circulations

Real Flexibility—Each ply is full-pasted to itself—but not to the other plies.

Armored Strength—The accurate overlapping of paper tube ends together with the built-in flexibility gives chain-mail strength to both ends of the bag.

New Full Wrap-around Valve Sleeve—This complete sleeve, combined with armored strength and real flexibility, means stronger, more sift-proof and cleaner bags.

All this adds up to wide service and greater values to all users of Bagpak multiwall bags.

For more information, prices and delivery dates, call nearest branch, or call direct.

produced on new equipment—the latest, most accurate, and finest machinery made.

International Paper COMPANY
BAGPAK DIVISION
220 EAST 42ND STREET, NEW YORK 17, N.Y.

AC-9

BRANCH OFFICES: Atlanta • Baltimore • Boston • Chicago • Cincinnati • Cleveland • Dallas • Denver • Des Moines • Detroit • Kansas City, Kansas • Los Angeles
Minneapolis • New Orleans • Philadelphia • St. Louis • San Francisco • IN CANADA: The Continental Paper Products, Ltd., Montreal, Ottawa, Toronto

Pyrenone* formulations are your—

Best Bet to Protect Corn

IT pays to protect the food value of corn — as it goes into storage. That's the only sensible way to protect its market value.

Pyrenone Grain Protectants, when properly applied to corn, popcorn, barley, rye and rough rice as they are binned, not only stop insect damage *before* it gets started . . . but continue to provide protection against new insect invasions all season long.

There is no effect upon the odor or taste of foods prepared from corn which has been treated with Pyrenone. Hence local mills can grind it into grits and meal for human consumption.

Under the Miller Bill, legal tolerances of Pyrenone — when applied to stored grains — are 20 p.p.m. for *piperonyl butoxide* and 3 p.p.m. for *pyrethrins.* These tolerances are ample to provide for preparatory spraying of bins as well as for treatment of the stored grain itself.

To protect hybrid seed corn against insect infestations, today's progressive seed growers apply a slurry made of Pyrenone O. F. 75-7.5. Seed corn treated with this slurry, and left over after the planting season, may be fed to farm animals with no ill effects whatsoever.

For complete information on Pyrenone, get in touch with the nearest office of Fairfield Chemical Division, Food Machinery and Chemical Corporation.

Pyrenone

GRAIN PROTECTANTS

FAIRFIELD
CHEMICALS
TRADE MARK

Sales Headquarters: 1701 Patapsco Avenue, Baltimore 26, Md. Branches in Principal Cities
In Canada: Natural Products Corporation, Toronto and Montreal

fmc
FOOD MACHINERY AND CHEMICAL CORPORATION ®

FMC CHEMICALS INCLUDE: WESTVACO *Alkalis, Chlorinated Chemicals and Carbon Bisulfide* • BECCO *Peroxygen Chemicals* • NIAGARA *Insecticides, Fungicides and Industrial Sulphur* • OHIO-APEX *Plasticizers and Chemicals* FAIRFIELD *Pesticide Compounds and Organic Chemicals* • WESTVACO *Phosphates, Barium and Magnesium Chemicals*